AFCTN Test Report 94-011

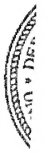
AFCTB-ID 93-005

Technical Publication Transfer

Using:

Northrop Corporation's Data

MIL-D-28000A (IGES)
MIL-M-28001A (SGML)
MIL-R-28002A (Raster)
MIL-D-28003 (CGM)



19960822 091

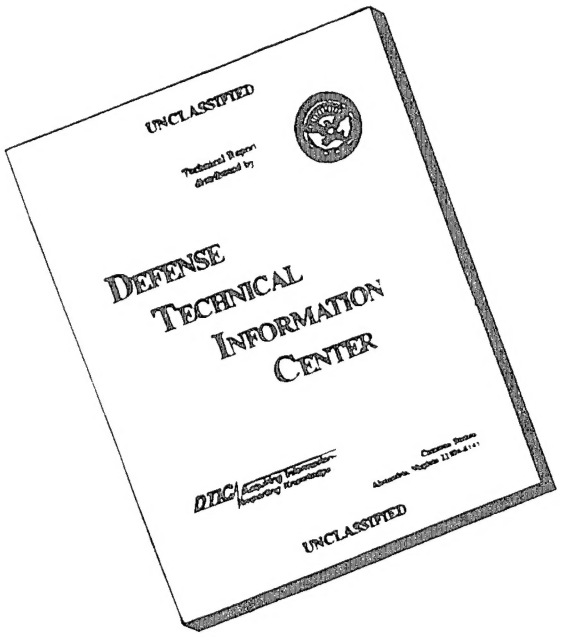
Quick Short Test Report

02 February 1993

Prepared for

Electronic Systems Center

DISCLAIMER NOTICE



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Quick Short Test Report

02 February 1993

Prepared By
Air Force CALS Test Bed
Wright-Patterson AFB, OH 45433

AFCTB Contact
Gary Lammers
(513) 427-2295

AFCTN Contact
Mel Lammers
(513) 427-2295

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Contents

1. Introduction

1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-Cycle Support (CALS) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze Northrop Corporation's interpretation and use of the CALS standards in transferring technical publication data. Northrop used its CALS Technical Data Interchange System to produce data in accordance with the standards and delivered it to the AFCTN technical staff on two 9-track magnetic tapes.

2. Test Parameters

Test Plan: AFCTB 93-005

Date of Evaluation: 2 February 1993

Evaluators:
George Elwood
Air Force CALS Test Bed
DET 2 HQ ESC/ENCP
Suite 300
4027 Colonel Glenn Hwy
Dayton OH 45431-1672

Data Originator:
Northrop Corporation
John Kent
B-2 Division
L591/GK
8900 East Washington Blvd.
Pico Rivera CA 90660
(310) 948-0624

Data Description: Technical Manual Test

- 6 Document Declaration files
- 6 Document Type Definitions (DTD)
- 8 Initial Graphics Exchange Specification (IGES) files
- 1 Text/Standard Generalized Markup Language (SGML) file
- 3 Raster files
- 11 Computer Graphics Metafile (CGM) files

Data Source System:

IGES

HARDWARE
Unknown

SOFTWARE
Unknown

Text/SGML

HARDWARE

Unknown

SOFTWARE

Unknown

Raster

HARDWARE

Unknown

SOFTWARE

Unknown

CGM

HARDWARE

Unknown

SOFTWARE

Unknown

Evaluation Tools Used:

MIL-STD-1840A (TAPE)

SUN 3/280

AFCTN *Tapetool v1.2.8 UNIX*
XSoft *CAPS/CALS v40.4*
Texas Instruments (TI) *Tapetool v1.0.1 UNIX*

MIL-D-28000 (IGES)

Sun SparcStation 2

ArborText *iges2draw*
IGES Data Analysis (IDA) *Parser/Verifier v92*
IDA *IGESView v3.05*
International TechneGroup Incorporated (ITI) *IGES/Works v1.3*
Rosetta Technologies *Preview v3.2*

PC 486/50

AUTODESK *AutoCAD 386 R12*
Cadkey *Cadkey v5.02*
Wiz Worx *IGESDRAW*

MIL-M-28001 (SGML)

PC 486/50

Exoterica *XGMLNormalizer v1.2e3.2*

MIL-R-28002 (Raster)

SUN SparcStation 2

ArborText *g42tiff*
AFCTN *validg4*
AFCTN *calstb.475*
IDA *IGESView v3.0*
Island Graphics *IslandPaint v3.0*

PC 486/50

Inset Systems *HiJaak v2.1*
Inset Systems *HiJaak Window v1.0*
Software Publishing Corporation (SPC) *Harvard Graphics v3.0*
Corel *Ventura Publisher*

MIL-D-28003 (CGM)

SUN SparcStation 2

ArborText *cgm2draw*
Island Graphics *IslandDraw v3.0*

PC 486/50

SPC *Harvard Graphics v3.05*
Inset Systems *HiJaak v2.1*
Inset Systems *HiJaak v1.0 Windows*
Micrografx *Designer v3.1*
Micrografx *Charisma v2.1*
Corel *Ventura Publisher*

Standards Tested:

MIL-STD-1840A
MIL-D-28000A
MIL-M-28001A
MIL-R-28002A
MIL-D-28003

3. 1840A Analysis

3.1 External Packaging

The tapes arrived at the Air Force CALS Test Bed (AFCTB) enclosed in a box in accordance with ASTM D 3951. The exterior of the box was marked with the required magnetic tape warning label, MIL-STD1840A, para. 5.3.1.3.

The tapes were enclosed in a barrier bags as required by MIL-STD-1840A, para. 5.3.1.2. Inspection of the tape reel showed the required label indicating the recording density as required by MIL-STD-1840A, para. 5.3.1. Enclosed in the box was a packing list showing all files that were recorded on the tapes.

3.2 Transmission Envelope

The 9-track tapes received by the AFCTB contained MIL-STD-1840A files. The files were named per the standard conventions.

3.2.1 Tape Formats

The two tapes received by the AFCTB were similar in content. One tape had one additional Raster and CGM file. While both tapes were evaluated, unless the tapes had different errors, tape one will be used for this evaluation.

The tapes were run through the AFCTN *Tapetool v1.2.8* utility. No errors were reported while evaluating the contents of the tapes labels. When the tapes were evaluated using TI's version of *Tapetool* many errors were reported. The TI version of *Tapetool* has been updated and many of the reported bugs with the AFCTN version of *Tapetool* have been corrected. All of the errors were the same and relate to an incorrect value for the Creation and Expiration date. The ANSI standard defines this value as a six digit number showing the year and Julian date. All files on both tapes reported the same error.

```
  Creation Date:    9326
 Expiration Date:   9326
 File Accessibility:
 Block Count: 000000
 Implementation Identifier:    CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.
```

All of the errors are shown in Appendix A, Section Two, of the Tape Import Log.

The tapes were also read using XSoft's *CAPS read1840A* utility. No problems were reported from this procedure.

3.2.2 Declaration and Header Fields

No errors were found in the Document Declaration file or the data file headers using either version of *Tapetool*.

4. IGES Analysis

The tapes contained eight IGES files. Each tape contained the same files but they were created using different software, which resulted in different errors. The files were checked for the required CALS MIL-D-28000A statement in the global section which was found.

All eight IGES files were evaluated using IDA's *Parser/ Verifier* set for CALS Class I. The files from tape two were reported as meeting the current CALS specification with a few minor nitpick errors noted. These files were created using ITI's *IGES/Works* software.

Files Q004 on tape one was reported as meeting the current specification with no reported errors. The remaining three files all had reported errors. Most of these errors were basic IGES errors. File Q006 also had reported CALS errors.

The error relates to an incorrect Z-axis vector in entity 126. The error is with the ZNORM value as define in CALS MIL-D-28000A, Table I, Note 8. The entire log file is included in the Appendix to this report.

```
 *** Entity type: 126

ERROR   4028: CALS Class I requires normal vector to be parallel to the Z-axis
              at D     77.

      126       74         0         1         0         0         0
      000000001D      77      126         0         2         2         0
      D      78


126,1,1,1,0,1,0,0.0,0.0,1.0,1.0,1.0,1.0,8.99992274,7.49996423,          77P      74
0.0,9.99871538,7.99936055,0.0,0.0,1.0,0.0,0.0,0.0;                     77P      75
                                                  ^^^
                                        Shall Be 1.0 or -1.0
```

The basic IGES error reported most relates to entity type 104. The start point of the conic was off by value as shown in the example below.

```
 *** Entity type: 104

WARNING 2265: Start point off conic by 2.666563E-03 at D      23.
```

The AFCTB has several tools for viewing IGES files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications. The use of these products is not an endorsement.

The four basic files consisted of CALS Class I files from various sources including the Class I AFCTN test files. The problems were noted between the translators on file Q005 from both tapes, file Q105 from tape one, and file Q205 from tape two, which were the most complex.

The files were translated using AUTODESK's *AutoCAD R12* with IGES processor V5.1. Both files had many reported errors

relating to misplaced lines. The resulting files were usable. Because of network problems, hard copies of the *AutoCAD R12* files are not available. In the detail area, file Q105 had numbers overlapping with the arrows stopping at the leader line. File Q205 had the number aligned vertically with the arrows stopping at the leader line.

Cadkey's *Cadkey* translated both files without a reported error. When displayed, file Q105 showed the horizontal overlapping numbers. File Q205 showed the vertically aligned numbers. The arrows were displayed correctly.

IDA's *IGESView* imported the files without a reported error. File Q105 displayed with a heavy line weight. The numbers overlapped but the arrow points were correct. File Q205 displayed with an acceptable line weight. The numbers were aligned vertically with the arrow points correct.

ArborText's *iges2draw* utility completed the translation without a reported error. When the resulting files were read into Island Graphics' *IslandDraw* the results were unacceptable for files Q104, Q105, Q204 and Q205. All four files appeared to be off both the screen and paper to the left. Files Q106, Q107, Q206 and Q207 appeared to be acceptable for inclusion in a technical publication.

The files were converted using Rosetta Technologies' *Prepare* and displayed using *Preview*. Files QX04, QX06, and QX07 displayed correctly. File Q105 displayed with heavy line weights and arrows that went through the leader line. File Q205 had acceptable line weights with arrows going through the leader lines.

The Wiz Worx *IGESDRAW* output files appear to match the other systems.

The IGES files on tape two meet the CALS MIL-D-28000A specification while the files on tape one do not. Even though the IGES files on tape two meet the specification, the inability of the ArborText postprocessor to convert the complex file into a usable file would make using this file in a technical publication difficult.

5. SGML Analysis

The two tapes contained three short text files and three DTD each. The text files from this document were tested using Exoterica's *XGMLNormalizer* parser. DTD G101 and G201 had a reported error which was easily fixed. An entity included in the DTD had the wrong data type. The "ras" was changed to "fax" and the DTDs parsed without an error. The remaining DTDs were parsed without a reported error. The text files also parsed without a reported error.

```
<!ENTITY test2.ras SYSTEM NDATA fax>
                                ^^^ Changed from ras
```

The file G101 and related text files were parsed without a reported error using another software available within the AFCTB. The remaining files were not evaluated.

6. Raster Analysis

The tapes contained three Raster files. Two of these files are type II files which the AFCTB can not evaluated. The remaining file was evaluated using the AFCTN *validg4* utility, which reported the file as meeting the CALS MIL-R-28002A specification.

The type I Raster file was imported and displayed without a problem using the AFCTN *calstb.475* utility. The image appeared to be scanned at a slight angle with a few orphan pixels noted.

The AFCTB has several tools for viewing Raster files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications. The use of these products is not an endorsement.

The type I file was converted using Inset Systems' *HiJaak* and import into Corel's *Ventura Publisher* without a reported problem. This file was also directly read into *HiJaak for Windows*, displayed and printed.

The type I file was converted using Rosetta Technologies' *Prepare* and viewed and printed using *Preview* without a reported problem.

The type I file was read directly into IDA's *IGESView*, displayed, and printed without a reported problem.

The file was converted using ArborText's *g42tiff* with the resulting file read into Island Graphics' *IslandPaint* without a problem.

The type I Raster file meets the CALS MIL-R-28002A specification. The AFCTB does not currently have the ability to evaluate Type II files.

Following are comments received from LLNL on the type II Raster files.

From: mitsch@lance.tis.llnl.gov (Nik Mitschkowetz)
Subject: Type-II & CGM
To: elwood@wpdis11.hq.aflc.af.mil
Status: RO

George:

Sorry about the delay in getting back to you on the Type-II file, we are a little thin here and shifting hardware about to get ready for Interop has made it difficult to get at and run ODATOOL.

The type II file had lots wrong with it, It was too far gone for ODATOOL to be able to locate or display the data. The tile index was not constructed correctly which kept ODATOOL form reconstructing the data elements:
Here are some details:

I retrieved the MIL-R-28002A Type-II Tiled Raster Image file you left on the network for testing. After bringing it over to LLNL via FTP in the binary mode, I ran it through the ODATOOL parser to establish the validity the ISO-8613 (ODA) data structure. Several errors were encountered:

1. In the Layout_Object, the attribute "Position" is not supported. A supported attribute is "Page_Position."

2. In the Content_Portion, Tiling_Offset attributes are not correctly encoded.

3. In the Content_Portion, the application comments are inconsistent with the structure of a tile index.

These flagged errors were fatal, preventing ODATOOL form rendering an image.

7. CGM Analysis

The tapes contained a total of eleven CGM files. Using a file compare utility, some exact files were found on both tapes. Of the eleven files, seven were unique.

All files were reported as meeting the CALS MIL-D-28003 specification. with no reported errors. The AFCTN beta *validcgm* reported errors with all files.

The AFCTB has several tools for viewing CGM files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications. The use of these products is not an endorsement.

The files were imported into SPC's *Harvard Graphics 3.05*. All files had reported errors during this procedure. The normal errors were line style, point adjustment, non-CGM entities, and non-translated entities. Tape one CGM file C104 was unusable. The AFCTN text grid was not displayed within the grid. The remaining files had only part of the entities displayed. Tape two was able to display the AFCTN grid somewhat better but there were noticeable errors. Hard copies of these files are included in the Appendix to this report.

The files were imported into Inset Systems' *HiJaak for Windows*. Only file T2 C004 could be read into the program. All of the remaining files caused the application to terminate. When Inset Systems' *HiJaak for DOS* was tried only file C004 could be converted. The remaining files caused system errors.

The files were imported directly into Island Graphics' *IslandDraw*. There were no reported errors during this process. All files were from tape one. File C004 had some noticeable errors. File C005 was not complete. Files C006 and C007 appeared to be correct. File C008 had a minor text over lap.

The files were converted using ArborText's *cgm2draw* utility with no reported errors. The resulting files were then read into Island Graphics' *IslandDraw*. The results of this procedure were acceptable images and prints.

An attempt was made to read the CGM files into the Corel's *Ventura Publisher*. None of the files would import, and displayed error messages.

An attempt was made to read the files into the Micrografx *Charisma* and *Designer*. None of the files would import, and displayed an error reporting an invalid file type.

According to Michael Harrison of Micrografx, "Micrografx is aware of the problems associated with reading these files and is working on a solution to be implemented in a future release of our products."

The files were reported as meeting the CALS MIL-D-28003 specification. The ability of commercial softwares to read the files were very limited with less than acceptable results in most cases.

8. Conclusions and Recommendations

In summary, the tape from Northrop Corporation had a large number of errors in the ANSI 3.27 header and EOF markers. The Document Declaration file and data file headers were without a reported error. Because of the errors in the ANSI tape mark headers, the physical structure of the tape does not meet the CALS MIL-STD-1840A requriements.

The eight IGES files were similar but constructed using different softwares. Only one of the files had a reported CALS error. The complex files displayed variations between systems. Noted were dimensioning label location and arrows. The files on tape two meet the CALS MIL-D-28000A specification, but the files on tape one do not.

The six DTDs and text files were parsed using two different utilities. After an error was corrected in DTD Gx02, they parsed without any reported errors.

The tapes contained three Raster files. Two of these files were Type II and the AFCTB does not have the capability to evaluate this file type. Comments received by the AFCTB at LLNL indicated the files do not meet the CALS MIL-R-28002A specification. The Type I file meets the CALS MIL-R-28002A specification.

The CGM files were reported as meeting the CALS MIL-D-28003 specification. However, the files were also tested using commercially available CGM utilities with less than complete success.

Because of the noted errors, the two tapes provided by Northrop Corporation do not meet the CALS MIL-STD-1840A requirements.

9. Appendix A - Tapetool Report Logs

9.1 Tape Catalog

Air Force CALS Test Network Catalog Evaluation - Version 1.2; Release Number 8

Standards referenced:
MIL-STD-1840A (1987) - Automated Interchange of Technical Information
ANSI X3.27 (1987) - File Structure and labeling of Magnetic Tapes for Information Interchange
ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Feb 1 12:25:20 1993
MIL-STD-1840A File Catalog
File Set Directory: /cals/tapetool8/Set099

Page: 1

File Name	File Type	Record Format/ Length	Block Length/Total	Selected/ Extracted
D001	Document Declaration	D/00260	02048/000001	Extracted
D002	Document Declaration	D/00260	02048/000001	Extracted
D003	Document Declaration	D/00260	02048/000001	Extracted
D001T001	Text	D/00260	02048/000001	Extracted
D001G002	DTD	D/00260	02048/000034	Extracted
D001H003	Output Specification	D/00260	02048/000001	Extracted
D001R004	Raster	F/00128	02048/000008	Extracted
D002T001	Text	D/00260	02048/000001	Extracted
D002G002	DTD	D/00260	02048/000034	Extracted
D002H003	Output Specification	D/00260	02048/000001	Extracted
D002C004	CGM	F/00080	00800/000006	Extracted
D002C005	CGM	F/00080	00800/000002	Extracted
D002C006	CGM	F/00080	00800/000002	Extracted
D002C007	CGM	F/00080	00800/000002	Extracted
D002C008	CGM	F/00080	00800/000002	Extracted
D003T001	Text	D/00260	02048/000001	Extracted
D003G002	DTD	D/00260	02048/000034	Extracted
D003H003	Output Specification	D/00260	02048/000001	Extracted
D003Q004	IGES	F/00080	02000/000012	Extracted
D003Q005	IGES	F/00080	02000/000573	Extracted
D003Q006	IGES	F/00080	02000/000033	Extracted
D003Q007	IGES	F/00080	02000/000042	Extracted

Catalog Process terminated normally.

9.2 Tape Evaluation Log

```
Texas Instruments Tape Evaluation - Version 1.0; Release Number 1
  Standards referenced:
    ANSI X3.27 (1987) - File Structure and labeling of Magnetic Tapes
                        for Information Interchange
    ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Feb  1 12:28:43 1993

ANSI Tape Import Log

Allocating tape drive /dev/rmt0...

/dev/rmt0 allocated.

VOL1ITDS01                CONTROLLER                                    4

  Label Identifier: VOL1
  Volume Identifier: ITDS01
  Volume Accessibility:
  Implementation Identifier:   CONTROLLER
  Owner Identifier:
  Label Standard Version: 4

HDR1D001             ITDS0100010001000100  9326  9326 000000  CONTROLLER

  Label Identifier: HDR1
  File Identifier: D001
  File Set Identifier: ITDS01
  File Section Number: 0001
  File Sequence Number: 0001
  Generation Number: 0001
  Generation Version Number: 00
  Creation Date:   9326
  Expiration Date:   9326
  File Accessibility:
  Block Count: 000000
  Implementation Identifier:   CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.
```

```
HDR2D0204800260                                    00

  Label Identifier: HDR2
  Recording Format: D
  Block Length: 02048
  Record Length: 00260
  Offset Length: 00

************ Tape Mark **************

************ Tape Mark **************

  Minimum Block Size Found = 2048 Bytes.
  Maximum Block Size Found = 2048 Bytes.

  Number of data blocks read = 1.

EOF1D001            ITDS0100010001000100  9326  9326 000001  CONTROLLER

  Label Identifier: EOF1
  File Identifier: D001
  File Set Identifier: ITDS01
  File Section Number: 0001
  File Sequence Number: 0001
  Generation Number: 0001
  Generation Version Number: 00
  Creation Date:   9326
  Expiration Date:   9326
  File Accessibility:
  Block Count: 000001
  Implementation Identifier:   CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.

EOF2D0204800260                                    00

  Label Identifier: EOF2
  Recording Format: D
  Block Length: 02048
  Record Length: 00260
  Offset Length: 00

************ Tape Mark **************
```

<<<<< *PART OF LOG REMOVED HERE* >>>>>

```
************ Tape Mark **************

HDR1D003Q006          ITDS0100010021000100  9326  9326 000000  CONTROLLER

  Label Identifier: HDR1
  File Identifier: D003Q006
  File Set Identifier: ITDS01
  File Section Number: 0001
  File Sequence Number: 0021
  Generation Number: 0001
  Generation Version Number: 00
  Creation Date:   9326
  Expiration Date:   9326
  File Accessibility:
  Block Count: 000000
  Implementation Identifier:   CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.

HDR2F0200000080                                    00

  Label Identifier: HDR2
  Recording Format: F
  Block Length: 02000
  Record Length: 00080
  Offset Length: 00

************ Tape Mark **************

************ Tape Mark **************

  Minimum Block Size Found = 2000 Bytes.
  Maximum Block Size Found = 2000 Bytes.

  Number of data blocks read = 33.

EOF1D003Q006          ITDS0100010021000100  9326  9326 000033  CONTROLLER

  Label Identifier: EOF1
  File Identifier: D003Q006
```

```
  File Set Identifier: ITDS01
  File Section Number: 0001
  File Sequence Number: 0021
  Generation Number: 0001
  Generation Version Number: 00
  Creation Date:   9326
  Expiration Date:   9326
  File Accessibility:
  Block Count: 000033
  Implementation Identifier:   CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.

EOF2F0200000080                                        00

  Label Identifier: EOF2
  Recording Format: F
  Block Length: 02000
  Record Length: 00080
  Offset Length: 00

********** Tape Mark **********

HDR1D003Q007          ITDS0100010022000100  9326  9326 000000  CONTROLLER

  Label Identifier: HDR1
  File Identifier: D003Q007
  File Set Identifier: ITDS01
  File Section Number: 0001
  File Sequence Number: 0022
  Generation Number: 0001
  Generation Version Number: 00
  Creation Date:   9326
  Expiration Date:   9326
  File Accessibility:
  Block Count: 000000
  Implementation Identifier:   CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.
```

```
HDR2F0200000080                                    00

  Label Identifier: HDR2
  Recording Format: F
  Block Length: 02000
  Record Length: 00080
  Offset Length: 00

************ Tape Mark **************

************ Tape Mark **************

  Minimum Block Size Found = 2000 Bytes.
  Maximum Block Size Found = 2000 Bytes.

  Number of data blocks read = 42.

EOF1D003Q007          ITDS0100010022000100  9326  9326 000042  CONTROLLER

  Label Identifier: EOF1
  File Identifier: D003Q007
  File Set Identifier: ITDS01
  File Section Number: 0001
  File Sequence Number: 0022
  Generation Number: 0001
  Generation Version Number: 00
  Creation Date:   9326
  Expiration Date:   9326
  File Accessibility:
  Block Count: 000042
  Implementation Identifier:   CONTROLLER

*** ERROR (ANSI X3.27; 8.5.1.10) - The last five characters in Creation
    Date must be digits.

*** ERROR (ANSI X3.27; 8.5.1.11) - The last five characters in Expiration
    Date must be digits.

EOF2F0200000080                                    00

  Label Identifier: EOF2
  Recording Format: F
  Block Length: 02000
  Record Length: 00080
  Offset Length: 00
```

```
************ Tape Mark **************

************ Tape Mark **************

############ End of Volume ITDS01 ##############

############ End Of Tape File Set ##############

Rewinding tape to load point...

Deallocating /dev/rmt0...

Tape Import Process terminated with 88 error(s), 0 warning(s),
and 0 note(s).
```

9.3 Tape File Set Validation Log

```
Air Force CALS Test Network File Set Evaluation - Version 1.2; Release Number 8
  Standards referenced:
    MIL-STD-1840A (1987) - Automated Interchange of Technical Information
    MIL-R-28002 (1989) - Raster Graphics Representation In Binary
                         Format, Requirements For

Mon Feb  1 12:25:20 1993

MIL-STD-1840A File Set Evaluation Log

File Set: Set099

Found file: D001
Extracting Document Declaration Header Records...
Evaluating Document Declaration Header Records...

srcsys: John P. Kent, ITDS Chief Engineer, Northrop Corporation, B-2 Division, L591/GK
948-0624
srcdocid: STPRO25.11
srcrelid: NONE
chglvl: ORIGINAL
dteisu: 19930126
dstsys: Jeff Fisher, Integration Manager, USAF CALS Test Bed, HQ AFMC (I)/ENCT, Techne
4027 Col. Glen Highway, Dayton, OH 45431-1601
dstdocid: CALS_RAS_TEST
dstrelid: NONE
dtetrn: 19930126
dlvacc: NONE
filcnt: T1, H1, G1, R1
ttlcls: UNCLASSIFIED
doccls: UNCLASSIFIED
doctyp: JOB GUIDE
docttl: graphics test

Found file: D001T001
Extracting Text Header Records...
Evaluating Text Header Records...

srcdocid: STPRO25.11
dstdocid: CALS_RAS_TEST
txtfilid: W
doccls: UNCLASSIFIED
notes: NONE
```

```
Saving Text Header File: D001T001_HDR
Saving Text Data File: D001T001_TXT

Found file: D001G002
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: STPRO25.11
dstdocid: CALS_RAS_TEST
notes: NONE

Saving DTD Header File: D001G002_HDR
Saving DTD Data File: D001G002_DTD

Found file: D001H003
Extracting Output Specification Header Records...
Evaluating Output Specification Header Records...

srcdocid: STPRO25.11
dstdocid: CALS_RAS_TEST
notes: NONE

Saving Output Specification Header File: D001H003_HDR
Saving Output Specification Data File: D001H003_OS

Found file: D001R004
Extracting Raster Header Records...
Evaluating Raster Header Records...

srcdocid: STPRO25.11
dstdocid: CALS_RAS_TEST
txtfilid: W
figid: NONE
srcgph: test2.ras
doccls: UNCLASSIFIED
rtype: 2
rorient: 000,270
rpelcnt: 002560,003584
rdensty: 0300
notes: NONE

Saving Raster Header File: D001R004_HDR
Saving Raster Data File: D001R004_GR4

Evaluating numbering scheme...
No errors were encountered during numbering scheme evaluation.
Numbering scheme evaluation complete.
```

```
Checking file count...
No errors were encountered during file count verification.
File Count verification complete.

No errors were encountered in Document D001.

Found file: D002
Extracting Document Declaration Header Records...
Evaluating Document Declaration Header Records...

srcsys: John P. Kent, ITDS Chief Engineer, Northrop Corporation, B-2 Division, L591/GK
948-0624
srcdocid: STPRO25.7
srcrelid: NONE
chglvl: ORIGINAL
dteisu: 19930126
dstsys: Jeff Fisher, Integration Manager, USAF CALS Test Bed, HQ AFMC (I)/ENCT, Techne
4027 Col. Glen Highway, Dayton, OH 45431-1601
dstdocid: CALS_CGM_TEST
dstrelid: NONE
dtetrn: 19930126
dlvacc: NONE
filcnt: T1, H1, G1, C5
ttlcls: UNCLASSIFIED
doccls: UNCLASSIFIED
doctyp: JOB GUIDE
docttl: graphics test

Found file: D002T001
Extracting Text Header Records...
Evaluating Text Header Records...

srcdocid: STPRO25.7
dstdocid: CALS_CGM_TEST
txtfilid: W
doccls: UNCLASSIFIED
notes: NONE

Saving Text Header File: D002T001_HDR
Saving Text Data File: D002T001_TXT

Found file: D002G002
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: STPRO25.7
```

```
dstdocid: CALS_CGM_TEST
notes: NONE

Saving DTD Header File: D002G002_HDR
Saving DTD Data File: D002G002_DTD

Found file: D002H003
Extracting Output Specification Header Records...
Evaluating Output Specification Header Records...

srcdocid: STPRO25.7
dstdocid: CALS_CGM_TEST
notes: NONE

Saving Output Specification Header File: D002H003_HDR
Saving Output Specification Data File: D002H003_OS

Found file: D002C004
Extracting CGM Header Records...
Evaluating CGM Header Records...

srcdocid: STPRO25.7
dstdocid: CALS_CGM_TEST
txtfilid: W
figid: NONE
srcgph: allreal.cgm
doccls: UNCLASSIFIED
notes: NONE

Saving CGM Header File: D002C004_HDR
Saving CGM Data File: D002C004_CGM

                    <<<<< PART OF LOG FILE REMOVED HERE >>>>>

Evaluating numbering scheme...
No errors were encountered during numbering scheme evaluation.
Numbering scheme evaluation complete.

Checking file count...
No errors were encountered during file count verification.
File Count verification complete.

No errors were encountered in Document D002.

Found file: D003
Extracting Document Declaration Header Records...
Evaluating Document Declaration Header Records...
```

```
srcsys: John P. Kent, ITDS Chief Engineer, Northrop Corporation, B-2 Division, L591/GK
948-0624
srcdocid: STPRO25.9
srcrelid: NONE
chglvl: ORIGINAL
dteisu: 19930126
dstsys: Jeff Fisher, Integration Manager, USAF CALS Test Bed, HQ AFMC (I)/ENCT, Techne
4027 Col. Glen Highway, Dayton, OH 45431-1601
dstdocid: CALS_IGES_TEST
dstrelid: NONE
dtetrn: 19930126
dlvacc: NONE
filcnt: T1, H1, G1, Q4
ttlcls: UNCLASSIFIED
doccls: UNCLASSIFIED
doctyp: JOB GUIDE
docttl: graphics test

Found file: D003T001
Extracting Text Header Records...
Evaluating Text Header Records...

srcdocid: STPRO25.9
dstdocid: CALS_IGES_TEST
txtfilid: W
doccls: UNCLASSIFIED
notes: NONE

Saving Text Header File: D003T001_HDR
Saving Text Data File: D003T001_TXT

Found file: D003G002
Extracting DTD Header Records...
Evaluating DTD Header Records...

srcdocid: STPRO25.9
dstdocid: CALS_IGES_TEST
notes: NONE

Saving DTD Header File: D003G002_HDR
Saving DTD Data File: D003G002_DTD

Found file: D003H003
Extracting Output Specification Header Records...
Evaluating Output Specification Header Records...
```

```
srcdocid: STPRO25.9
dstdocid: CALS_IGES_TEST
notes: NONE

Saving Output Specification Header File: D003H003_HDR
Saving Output Specification Data File: D003H003_OS

Found file: D003Q004
Extracting IGES Header Records...
Evaluating IGES Header Records...

srcdocid: STPRO25.9
dstdocid: CALS_IGES_TEST
txtfilid: W
figid: NONE
srcgph: apple2d.igs
doccls: UNCLASSIFIED
notes: NONE

Saving IGES Header File: D003Q004_HDR
Saving IGES Data File: D003Q004_IGS

                    <<<<< PART OF LOG FILE REMOVED HERE >>>>>

Evaluating numbering scheme...
No errors were encountered during numbering scheme evaluation.
Numbering scheme evaluation complete.

Checking file count...
No errors were encountered during file count verification.
File Count verification complete.

No errors were encountered in Document D003.

No errors were encountered in this File Set.

MIL-STD-1840A File Set Evaluation Complete.
```

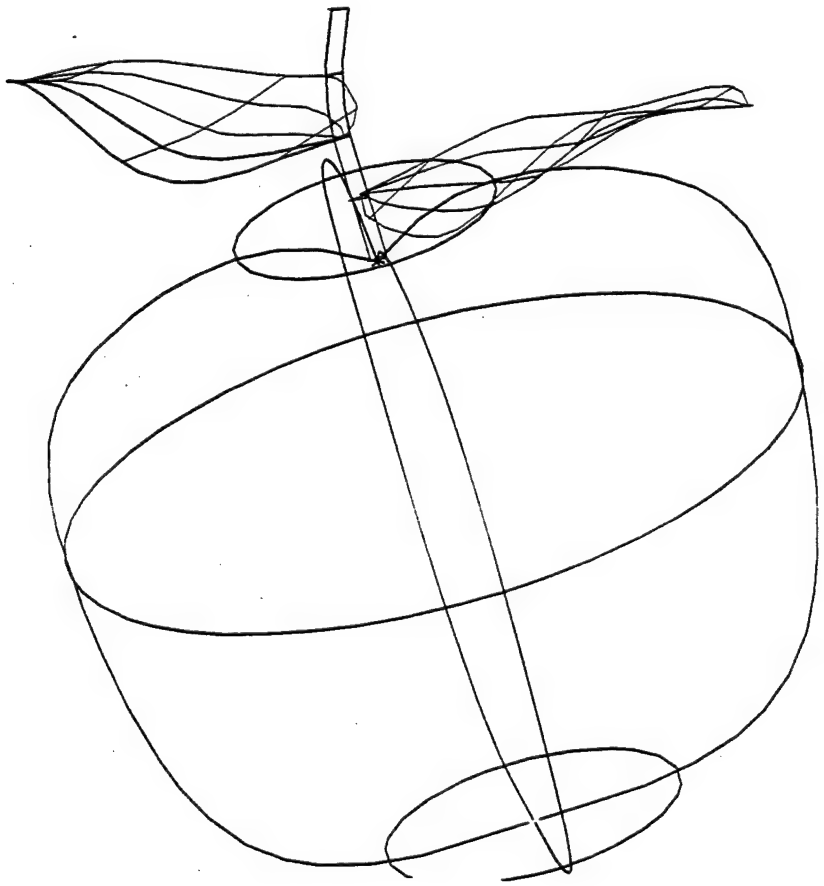
9.4 Other Tape Reading Logs

Include other log here if errors were reported.

10. Appendix B - Detailed IGES Analysis

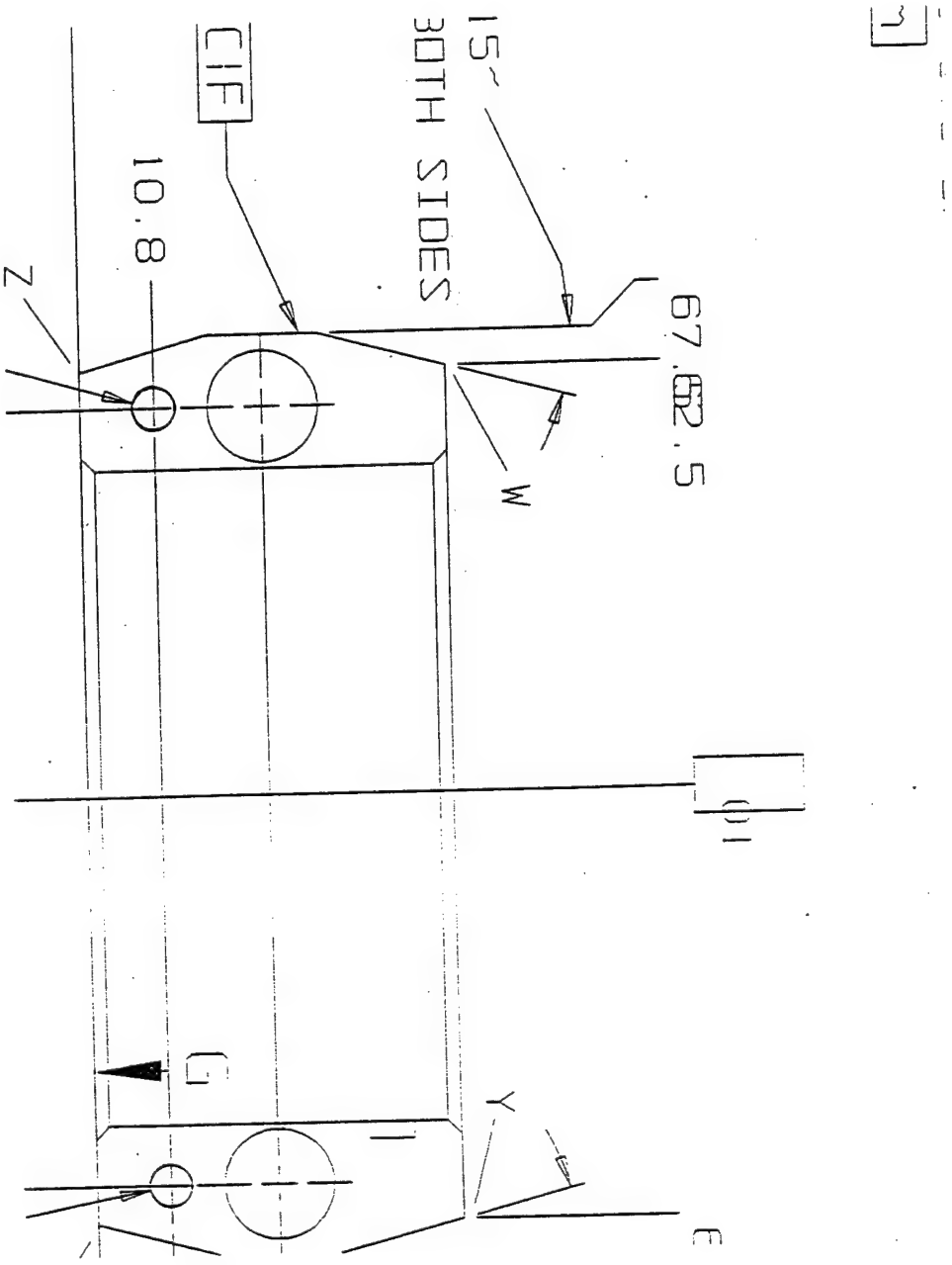
10.1 File Q104

10.1.1 Output IGESView

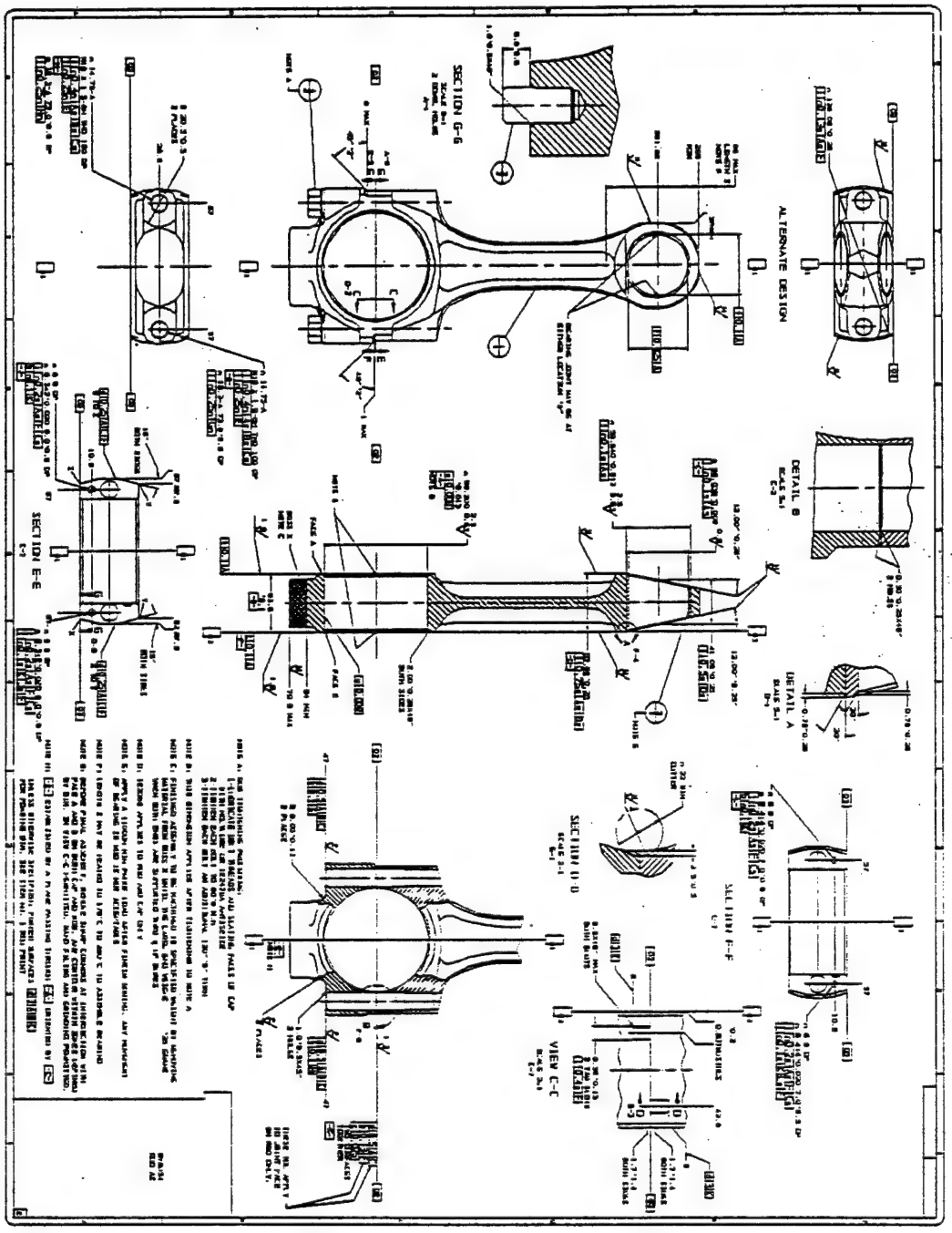


10.2 File Q105

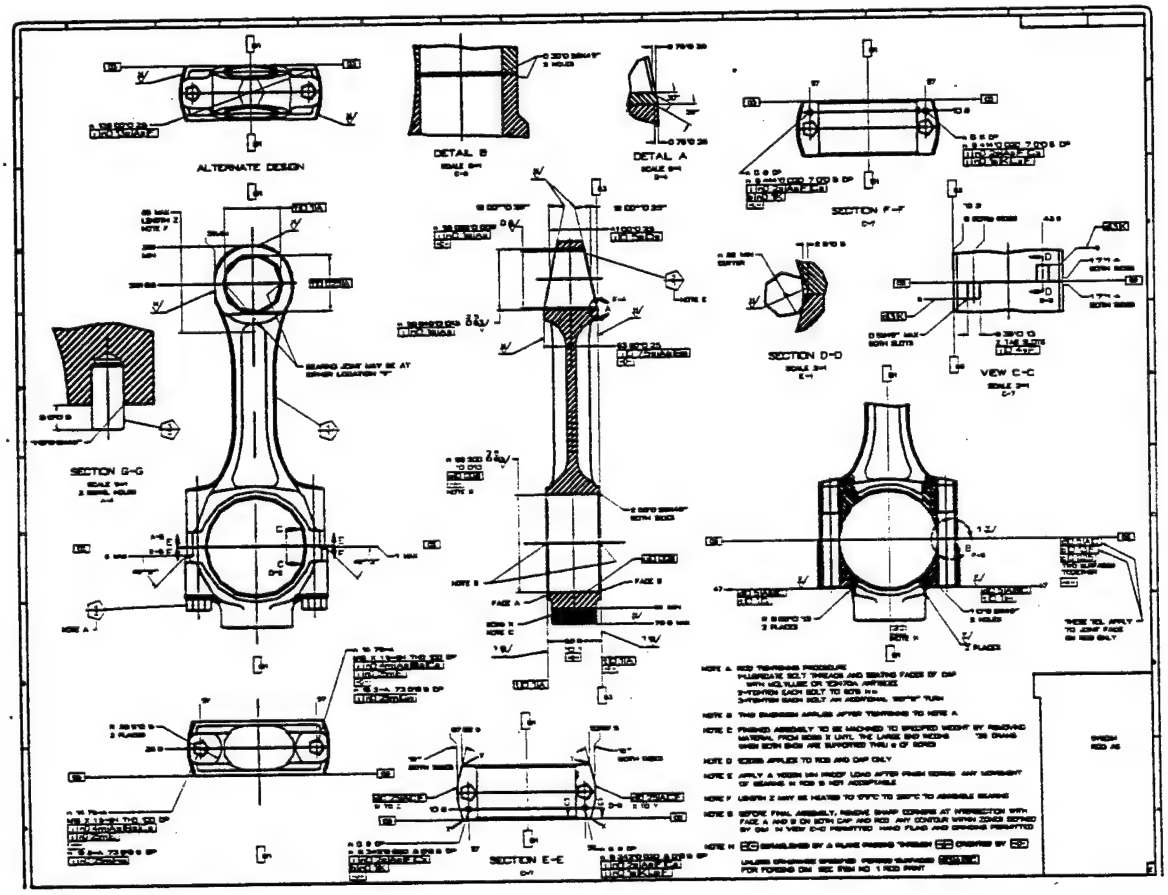
10.2.1 Output Cadkey v5.02



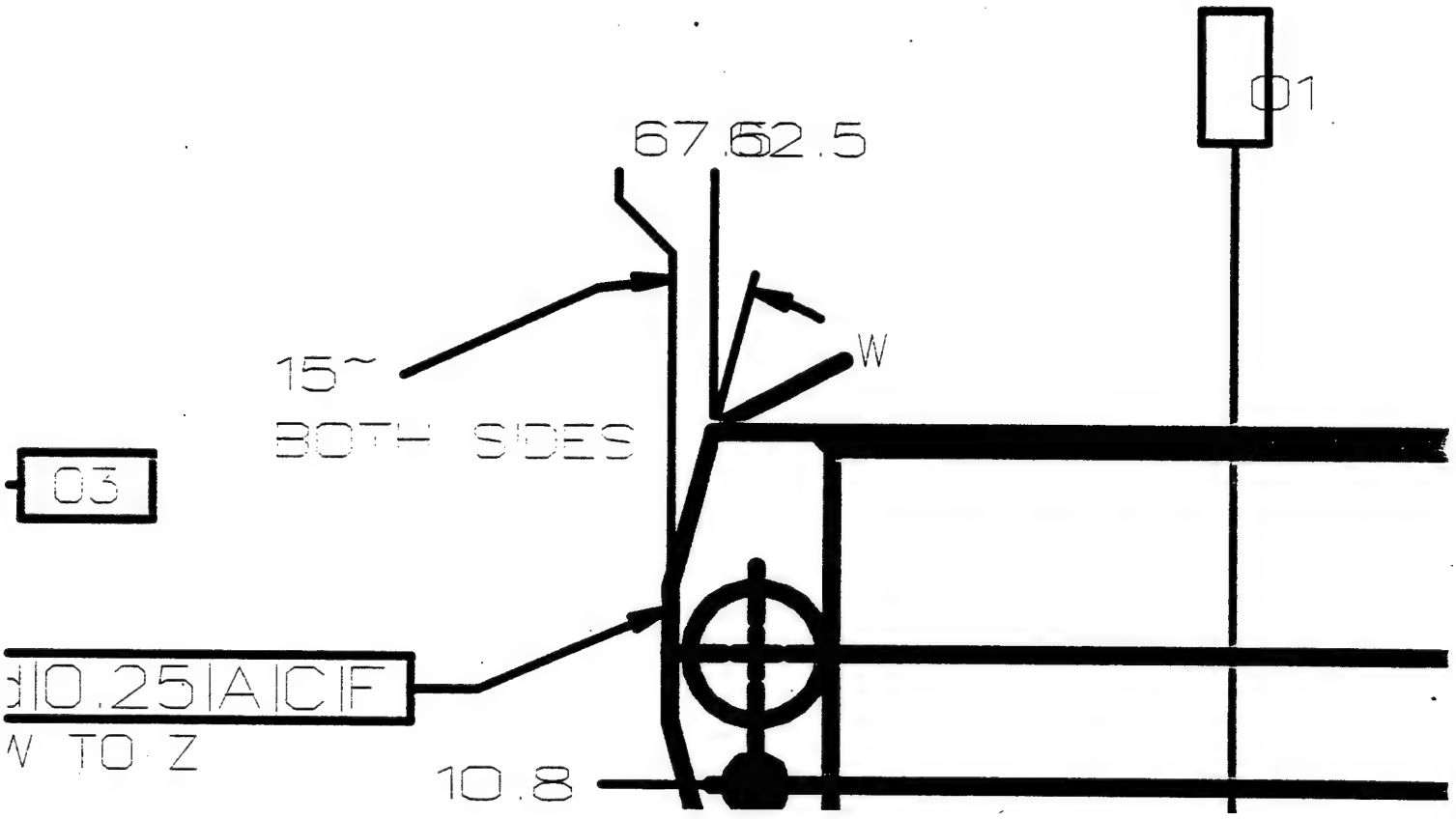
10.2.2 Output Cadkey v5.02 - Detail



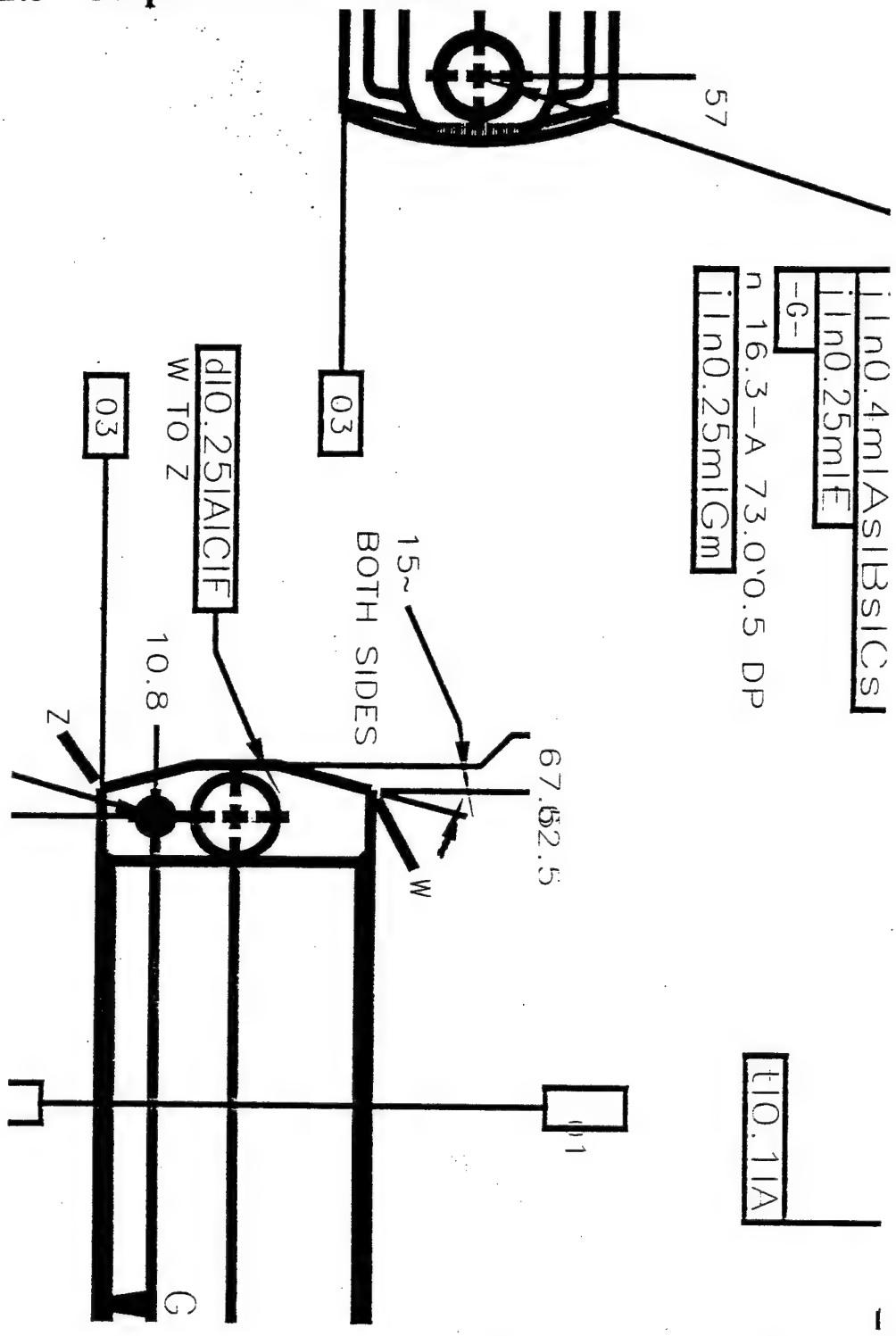
10.2.3 Output IGESView



10.2.4 Output IGESView - Detail

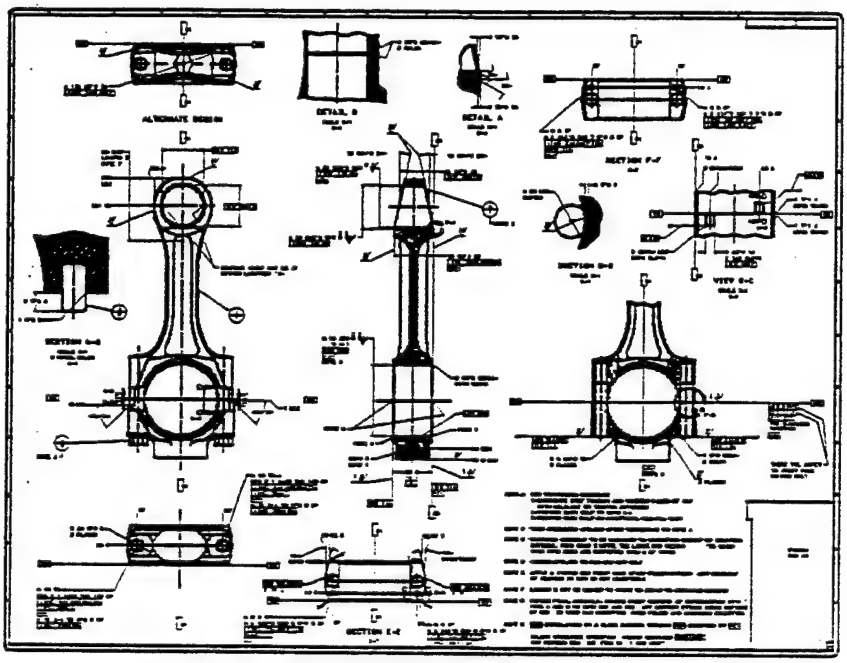


10.2.5 Output Preview - Detail



10.2.6 Output Wiz Worx IGESDRAW

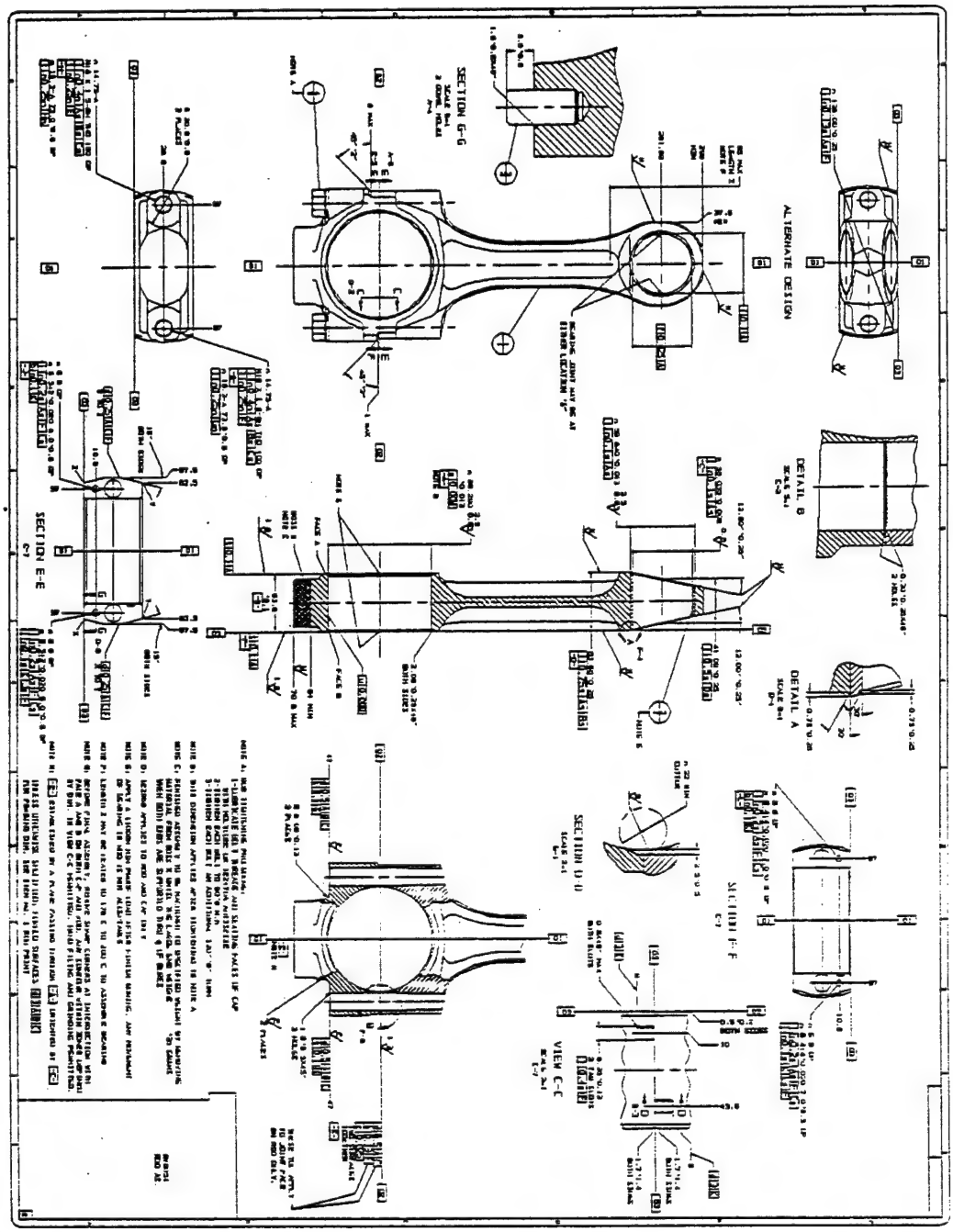
\9305\05A2\Q105



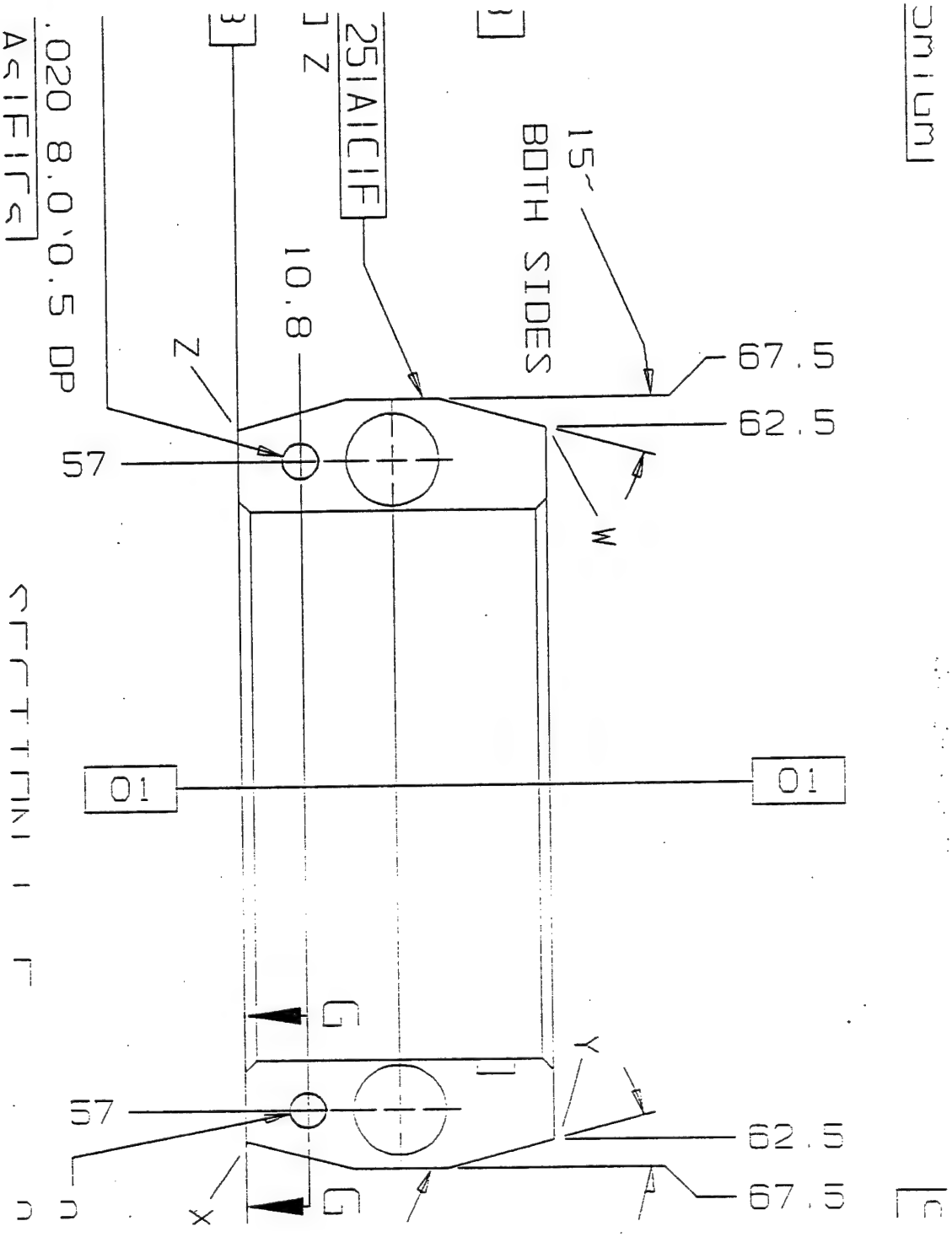
Tue 02-Feb-93 12:57:22 - LJGRAFIX™ Version 4.1 - © 1992 by WIZ WORX (DAHarrod)

10.3 File Q205

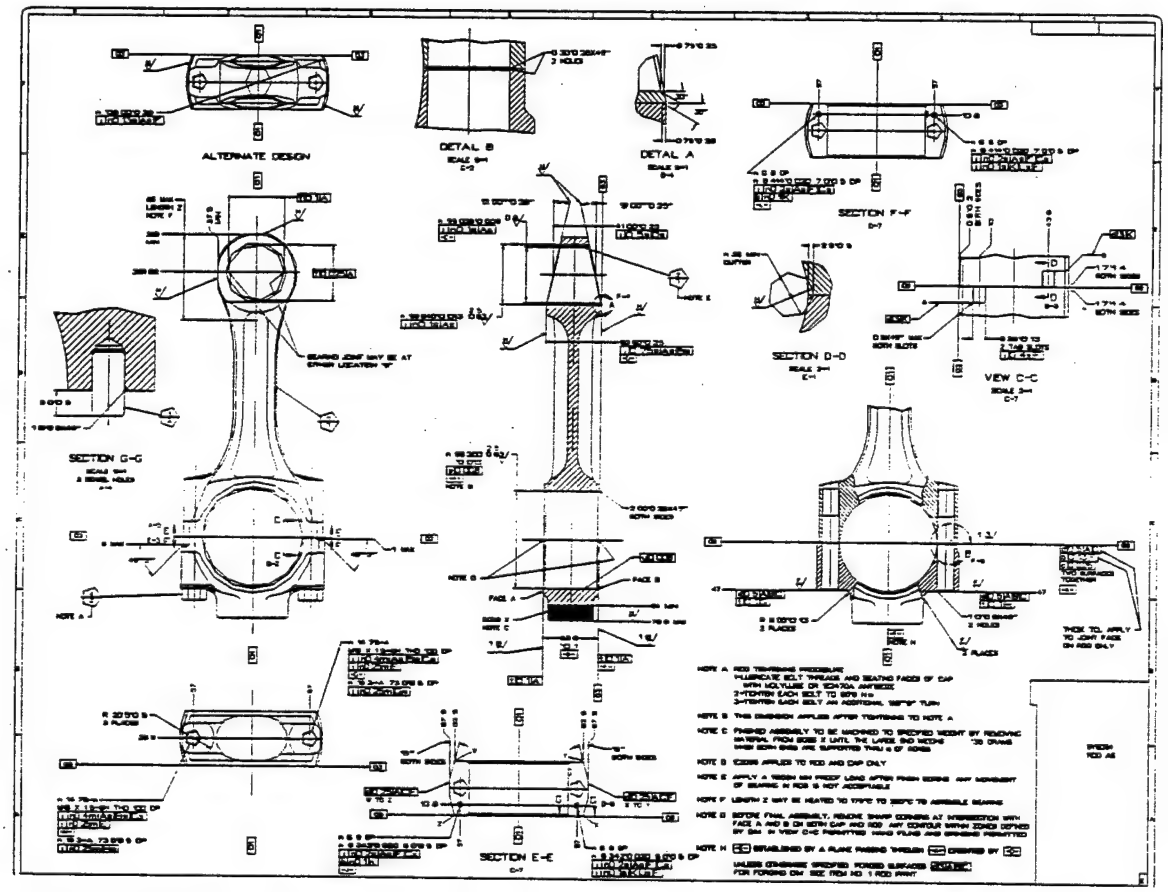
10.3.1 Output Cadkey v5.02



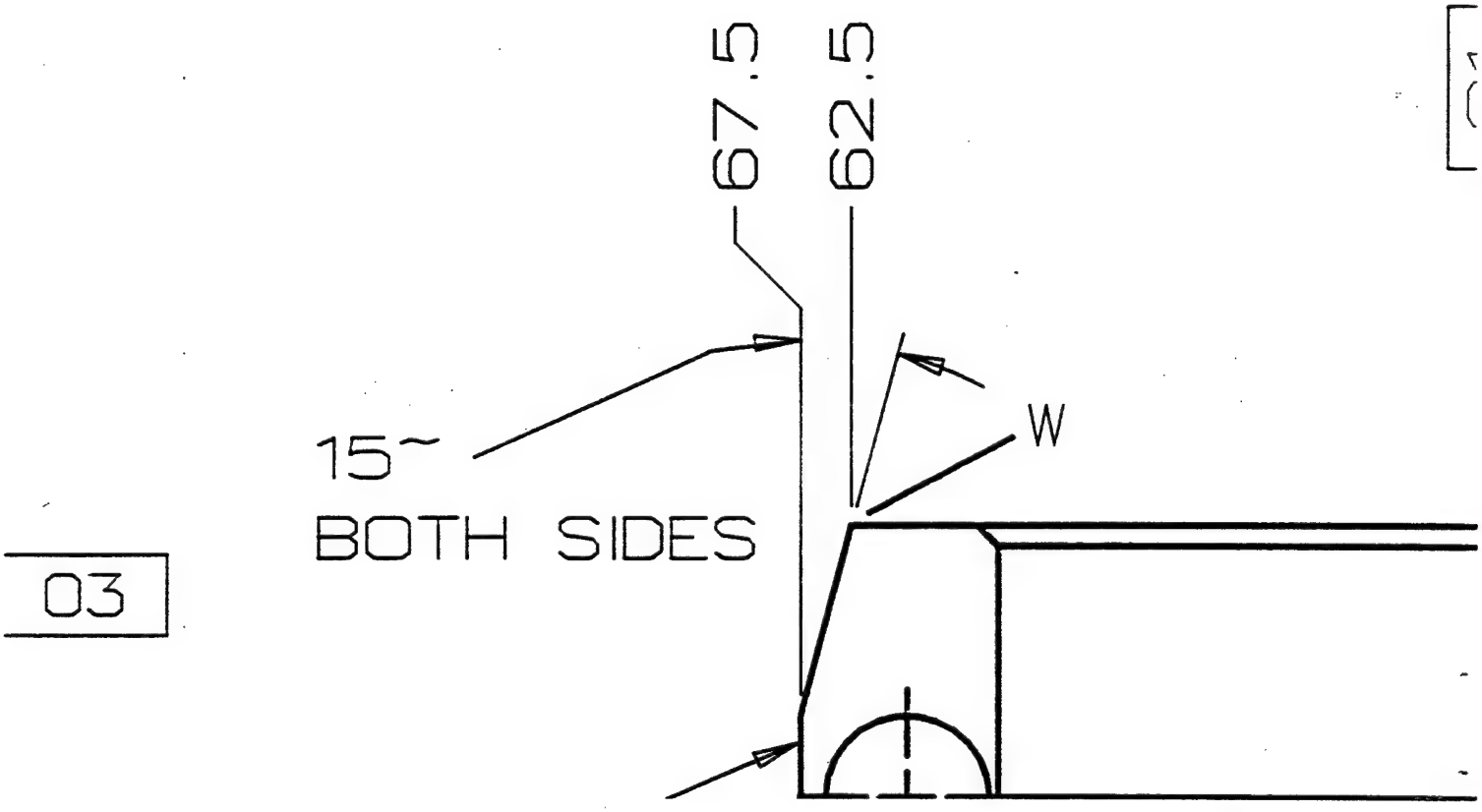
10.3.2 Output Cadkey v5.02 - Detail



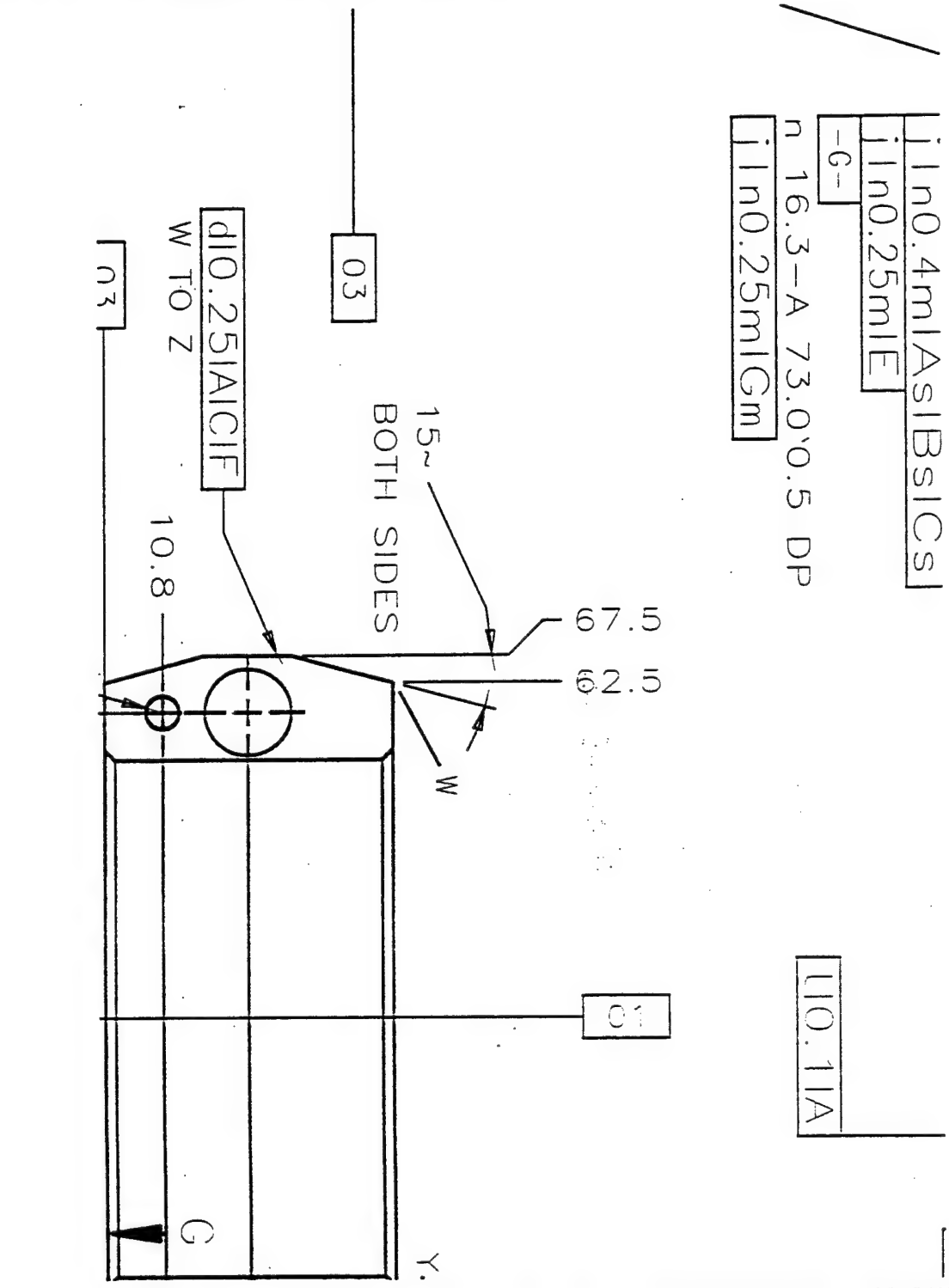
10.3.3 Output IGESView



10.3.4 Output IGESView - Detail

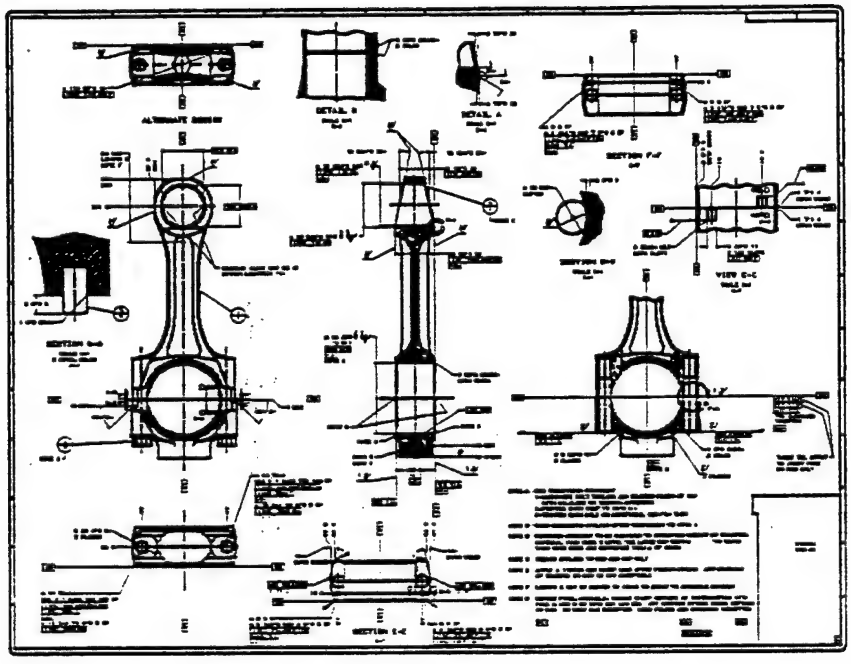


10.3.5 Output Preview - Detail



10.3.6 Output Wiz Worx IGESDRAW

\9305\05B2\Q205



Wed 03-Feb-93 08:56:22 - LJGRAFIX™ Version 4.1 - © 1992 by WIZ WORX (DAHarrod)

10.4 File Q106

10.4.1 Parser/Verifier Log

```
          *** IGES DATA FILE ANALYSIS ***
          ***       MARCH 1992       ***
          ***   IGES Data Analysis   ***
          ***     (708) 449-3430     ***

 Input file is /mnt/Set099/D003/D003Q006_IGS

 Checking conformance to CALS Class I (MIL-D-28000A 2/10/92)

 Today is February 1, 1993  2:14 PM

*** File and Product Name Information ***

   File name from sender     = 'ientity.igs'
   File creation Date.Time   = '930125.125005'
   Model change Date.Time    = ''
   Author                    = 'KASSEL'
   Department                = 'Air Force CALS Test Network'
   Product name from sender  = 'ientity.igs'
   Destination product name  = 'ientity.igs'

*** Parameter Delimiters ***

   Delimiter  = ','
   Terminator = ';'

*** Originating System Data ***

   System ID              = 'ITDS CONVERTER: GEF_IGES'
   Preprocessor version   = '1.0'
   Specification version = 6 (IGES 4.0)

*** Precision levels ***
   Integer bits =    32
   Floating point  -  Exponent =    38  Mantissa =     6
   Double precision - Exponent =   308  Mantissa =    15

*** Global Model Data ***

   Model scale            =  1.0000E+00
   Unit flag              =  1
```

```
    Units                  =  'IN'
    Line weights           =  1
    Maximum line thickness =  1.680104E-02
    Minimum line thickness =  1.680104E-02
CAUTION 2317: Maximum line thickness equal to minimum thickness.
    Granularity            =  1.000000E-03
    Maximum coordinate     =  1.690002E+01

    Drafting standard applicable to original data is not specified.


 *** Status Flag Summary ***

  Blank status: Visible                      200
                Blanked                        0

  Independence: Independent                  185
                Physically Subordinate        12
                Logically Subordinate          3
                Totally Subordinate            0

  Entity use:   Geometry                      67
                Annotation                   132
                Definition                     1
                Other                          0
                Logical/Positional             0
                2D parametric                  0
                Not Specified                  0

  Hierarchy:    Structure DE applies           0
                Subordinate DE applies       200
                Hierarchy property applies     0
                Not Specified                  0

 *** Entity Occurrence Counts ***

  Entity   Form    Level     Count     Type
  ------   ----    -----     -----     ----

    100       0        0         3     Circular arc
    102       0        0         1     Composite curve
    104       1        0         2     Conic arc - ellipse
    104       2        0         1     Conic arc - hyperbola
    104       3        0         1     Conic arc - parabola
    106      11        0         1     Copious data - Piecewise planar, linear string(2D
    path)
    106      63        0         1     Simple closed planar curve
```

110	0	0	27	Line
112	0	0	2	Parametric spline curve
124	0	0	12	Transformation matrix
126	0	0	6	Rational B-spline curve
212	0	0	129	General note
230	0	0	1	Sectioned area (Standard Crosshatching)
308	0	0	1	Subfigure definition
404	0	0	1	Drawing
406	16	0	1	Property - Drawing size
406	18	0	1	Property - Intercharacter spacing
408	0	0	8	Single subfigure instance
410	0	0	1	View - Orthographic parallel

*** Entity Count by Level ***

Level	Count
0	200

*** Labeling Information ***

0% of the entities are labeled.

Unlabeled 200

*** Line Fonts Used in Data ***

100	102	104	106	108	110	112	114	
-	-	-	-	-	-	-	-	Undefined
3	1	4	2	-	27	2	-	Solid
-	-	-	-	-	-	-	-	Dashed
-	-	-	-	-	-	-	-	Phantom
-	-	-	-	-	-	-	-	Center-line
-	-	-	-	-	-	-	-	Dotted
-	-	-	-	-	-	-	-	User defined

116	118	120	122	124	125	126	128	
-	-	-	-	12	-	-	-	Undefined
-	-	-	-	-	-	6	-	Solid
-	-	-	-	-	-	-	-	Dashed
-	-	-	-	-	-	-	-	Phantom
-	-	-	-	-	-	-	-	Center-line
-	-	-	-	-	-	-	-	Dotted
-	-	-	-	-	-	-	-	User defined

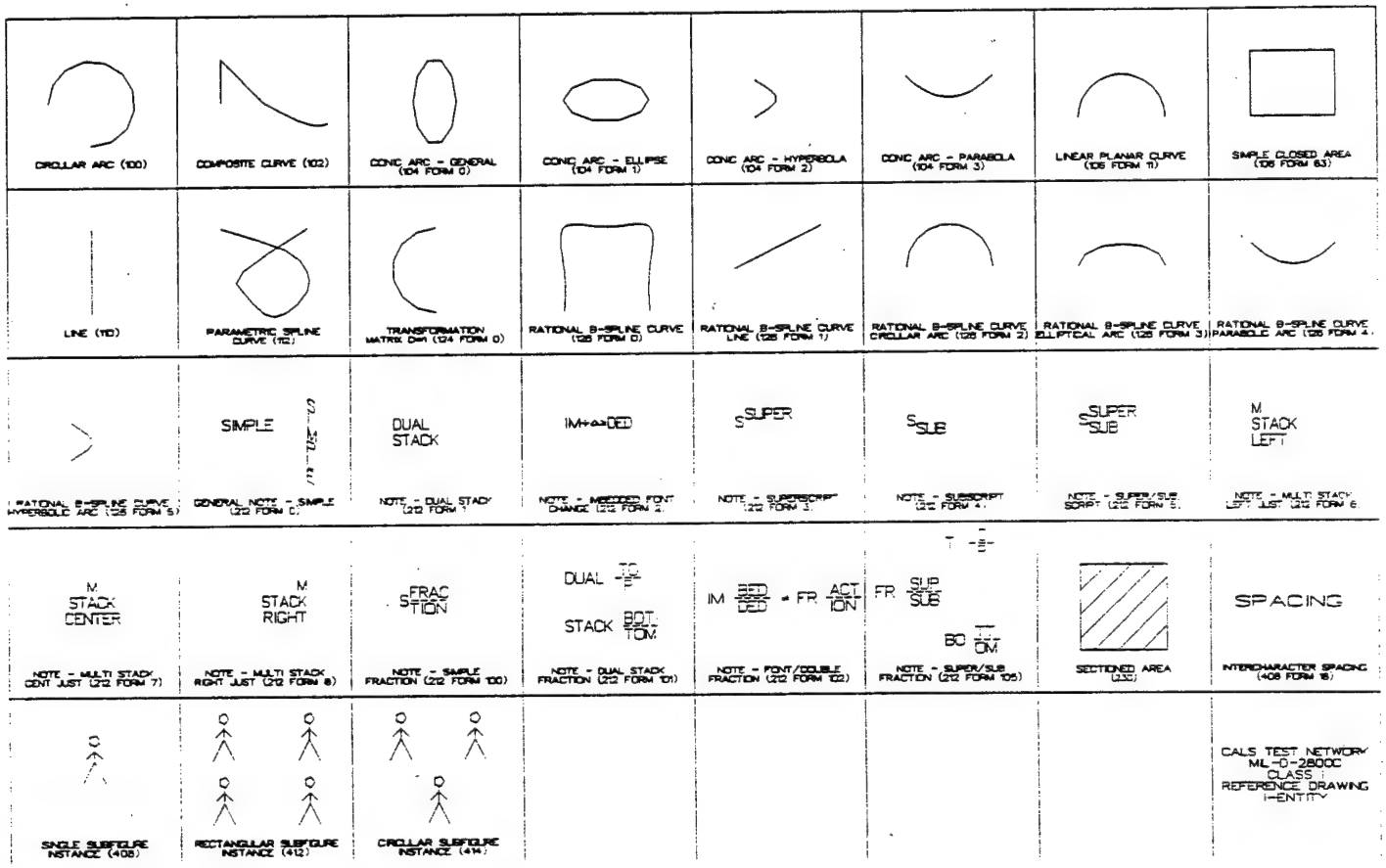
130	132	134	136	138	140	142	144

```
  -    -    -    -    -    -    -    -   Undefined
  -    -    -    -    -    -    -    -   Solid
  -    -    -    -    -    -    -    -   Dashed
  -    -    -    -    -    -    -    -   Phantom
  -    -    -    -    -    -    -    -   Center-line
  -    -    -    -    -    -    -    -   Dotted
  -    -    -    -    -    -    -    -   User defined

 *** Line Widths Used in Data ***

     Weight       Count      Width

  Defaulted       200       (0.0168)

 *** Colors Used in Data ***

  Defaulted        25
        Red       175


 ********************************
 ******  ENTITY ANALYSIS  ******
 ********************************

 *** Entity type: 100

 *** Entity type: 102

 *** Entity type: 104

WARNING 2265: Start point off conic by 2.666563E-03 at D      23.
WARNING 2265: Start point off conic by 1.456414E-03 at D      27.

 *** Entity type: 106

 *** Entity type: 110

  --     27 lines averaging 7.155336E+00 units --

 *** Entity type: 112

 *** Entity type: 124

12 transformation matrices, 4 non-zero translations.
NOTE     2341: 4 matrices contain translation information.
```

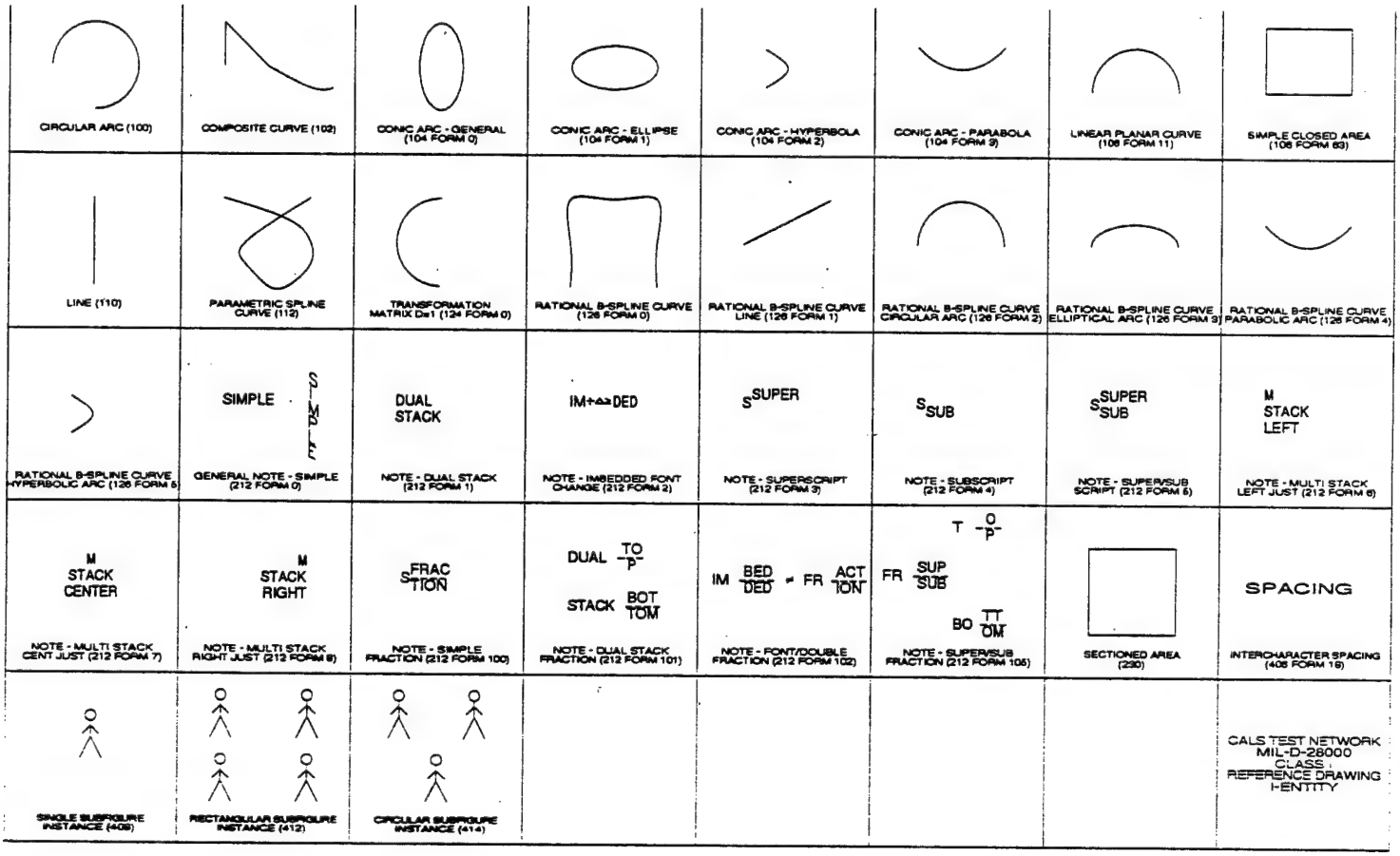
```
 *** Entity type: 126

ERROR    4028: CALS Class I requires normal vector to be parallel to the Z-axis
               at D      77.
ERROR    4028: CALS Class I requires normal vector to be parallel to the Z-axis
               at D      79.
ERROR    4028: CALS Class I requires normal vector to be parallel to the Z-axis
               at D      81.
ERROR    4028: CALS Class I requires normal vector to be parallel to the Z-axis
               at D      83.
ERROR    4028: CALS Class I requires normal vector to be parallel to the Z-axis
               at D      85.
ERROR    4028: CALS Class I requires normal vector to be parallel to the Z-axis
               at D      87.

 *** Entity type: 212

       129 text strings in data file.
       Average text aspect ratio in file is 0.9982937.
       Minimum text aspect ratio in file is 0.7978667.
       Maximum text aspect ratio in file is 1.4857143.

       FONTS USED IN FILE

       FONT    COUNT    NAME

          1      127    Default ASCII Style
       1002        2    Symbol Font 2

 *** Entity type: 230

 *** Entity type: 308

  Subfigure name at D      19: 'subfig0'.
    Number of included entities = 6.

 *** Entity type: 404

Drawing at D       5 contains 1 views.
Drawing at D       5 contains 0 annotation entities.

 *** Entity type: 406

 *** Entity type: 408

  Subfigure instance at D     363 references subfigure at D      19.
  Subfigure instance at D     373 references subfigure at D      19.
```

```
  Subfigure instance at D     377 references subfigure at D      19.
  Subfigure instance at D     381 references subfigure at D      19.
  Subfigure instance at D     385 references subfigure at D      19.
  Subfigure instance at D     389 references subfigure at D      19.
  Subfigure instance at D     393 references subfigure at D      19.
  Subfigure instance at D     397 references subfigure at D      19.

 *** Entity type: 410

  Scale of view at D       1 is 1.000000E+00.
Orthographic View entity at D       1 has  0 clipping planes specified.
   XMIN = Not Set        XMAX = Not Set
   YMIN = Not Set        YMAX = Not Set
   ZMIN = Not Set        ZMAX = Not Set

 *** Message Summary ***

2015: 2 Mathematically incorrect definitions.
2018: 1 Problems with line weight/width display information.
4000: 6 Miscellaneous CALS messages

 *** Error Summary ***

     0 fatal errors
     0 severe errors
     6 errors
     2 warnings
     1 cautions
     0 nitpicks
     1 notes

 *** End of Analysis of /mnt/Set099/D003/D003Q006_IGS ***
```

10.4.2 Output IGESView

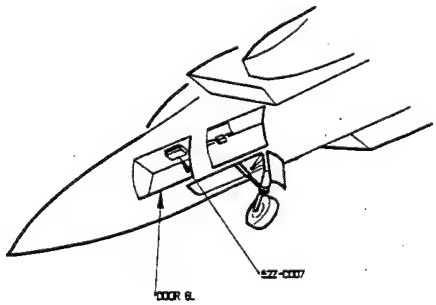


10.4.3 Output iges2draw/IslandDraw



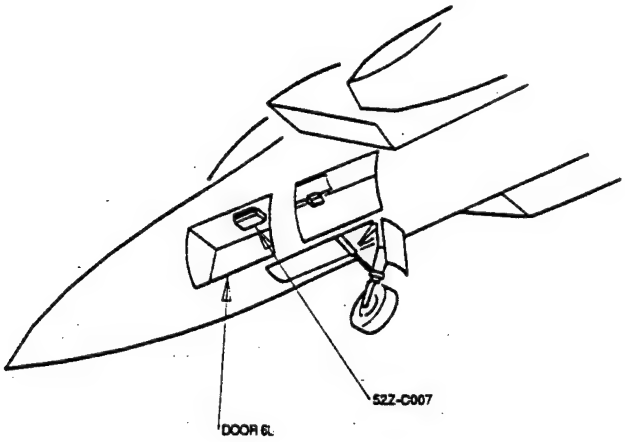
10.5 File Q107

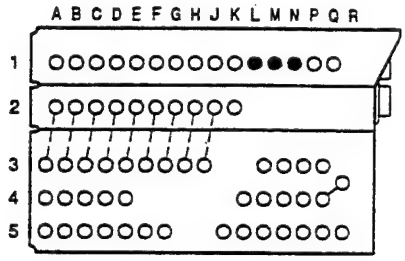
10.5.1 Output IGESView



522-0007	ESSENTIAL CIRCUIT BREAKER PANEL NO. 1		(24-50-12)
REF DES	ZONE	NOMENCLATURE	SIZE
41280033	L1	R MLG WOW PWR	28VDC ESS 28VDC
41280034	M1	L MLG WOW PWR	28VDC ESS 28VDC
42280005	N1	LDG GR POS IND	28VDC ESS 28VDC

10.5.2 Output iges2draw/IslandDraw





52Z-C007

52Z-C007	ESSENTIAL CIRCUIT BREAKER PANEL NO. 1		(24-50-12)
REF DES	ZONE	NOMENCLATURE	BUS
41CBC033	L1	R MLG WOW PWR 28VDC	ESS 28VDC
41CBC034	M1	L MLG WOW PWR 28VDC	ESS 28VDC
42CBC005	N1	LDG GR POS IND 28VDC	ESS 28VDC

CALS Test Network LGTABLE Reference Illustration

11. Appendix C - Detailed SGML Analysis

11.1 Parser Log

```
            SGML Document Type Definition Parser
                An SGML System Conforming to
              International Standard ISO 8879
            Standard Generalized Markup Language

Log file: '9305a1.LOG'
SDO File: 'ctndecl.sdo'
Namecase General is yes.
Namecase Entity is no.
Parsing DTD file: '9305a1.dtd'

DTD0095: Start tag for element 'DATABASE' cannot be omitted if the
         element had declared content (CDATA, RCDATA, EMPTY).
DTD0095: Start tag for element 'MEDIUM' cannot be omitted if the
         element had declared content (CDATA, RCDATA, EMPTY).
DTD0096: The generic ID SHORTTITLE has not been used in any content
         model, inclusion, or as a doctype element.
DTD0096: The generic ID CONTASSURPG has not been used in any content
         model, inclusion, or as a doctype element.
DTD0096: The generic ID REFDOC has not been used in any content
         model, inclusion, or as a doctype element.
DTD0096: The generic ID CFGPGE has not been used in any content
         model, inclusion, or as a doctype element.
DTD0096: The generic ID COVERINDEX has not been used in any content
         model, inclusion, or as a doctype element.
DTD0096: The generic ID STALOC has not been used in any content
         model, inclusion, or as a doctype element.
DTD0096: The generic ID TESTCODE has not been used in any content
         model, inclusion, or as a doctype element.
This DTD conforms to the ISO 8879 standard

DTO file '9305a1.DTO' created

closing statistics:
    Capacity points:                  71944
    Bytes of DTO file string space:   12674
    SGML descriptor blocks:           7108

Document Type Definition is compliant and parsed normally.

Program status code: 0.
```

11.2 Exoterica Parser

After correction noted in text, no reported errors in DTD or text files.

12. Appendix D - Detailed Raster Analysis

12.1 File T2 - D001R004

12.1.1 HiJaak for Windows

U.S. ARMY MATERIEL COMMAND
U.S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA

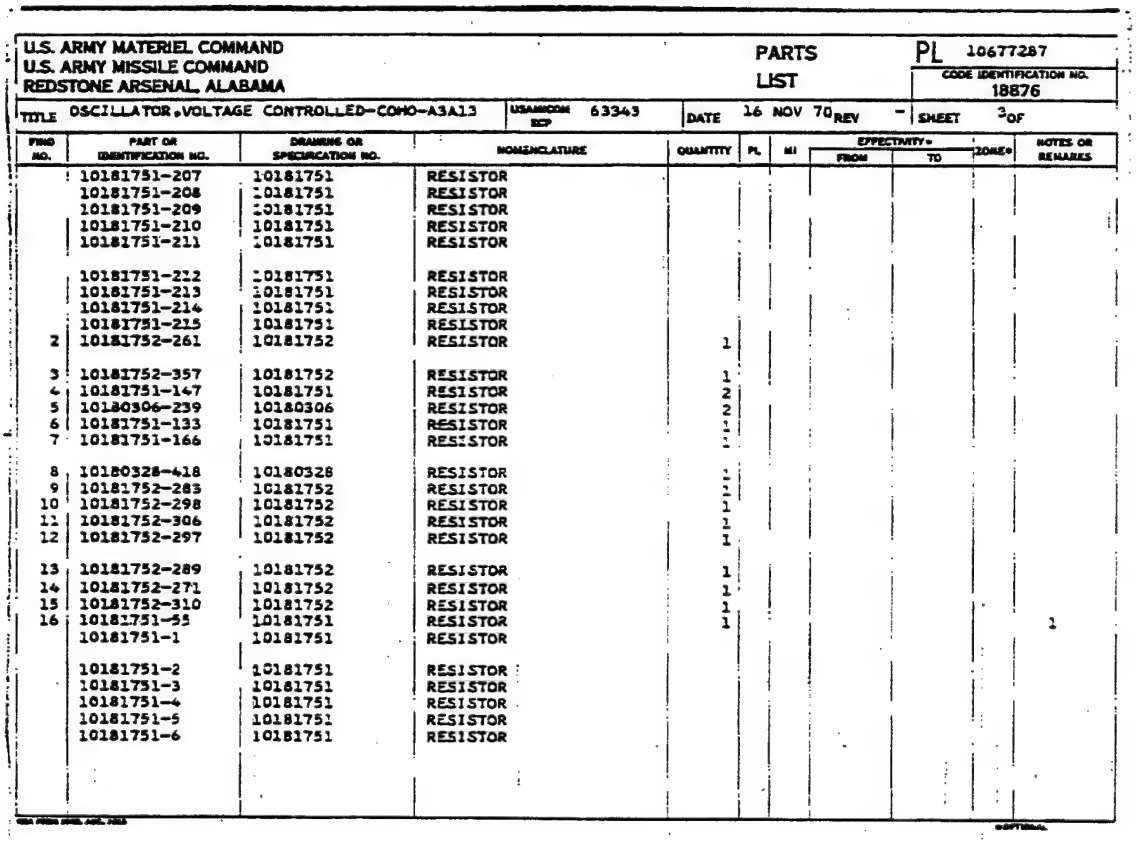
PARTS LIST

PL 10677287
CODE IDENTIFICATION NO. 18876

TITLE OSCILLATOR,VOLTAGE CONTROLLED-COHO-A3A13 | USAMICOM ECP 63343 | DATE 16 NOV 70 REV - | SHEET 3 OF

FIND NO.	PART OR IDENTIFICATION NO.	DRAWING OR SPECIFICATION NO.	NOMENCLATURE	QUANTITY	PL	MI	EFFECTIVITY FROM	EFFECTIVITY TO	ZONE	NOTES OR REMARKS
	10181751-207	10181751	RESISTOR							
	10181751-208	10181751	RESISTOR							
	10181751-209	10181751	RESISTOR							
	10181751-210	10181751	RESISTOR							
	10181751-211	10181751	RESISTOR							
	10181751-212	10181751	RESISTOR							
	10181751-213	10181751	RESISTOR							
	10181751-214	10181751	RESISTOR							
	10181751-215	10181751	RESISTOR							
2	10181752-261	10181752	RESISTOR	1						
3	10181752-357	10181752	RESISTOR	1						
4	10181751-147	10181751	RESISTOR	2						
5	10180306-239	10180306	RESISTOR	2						
6	10181751-133	10181751	RESISTOR	1						
7	10181751-166	10181751	RESISTOR	1						
8	10180328-418	10180328	RESISTOR	1						
9	10181752-283	10181752	RESISTOR	1						
10	10181752-298	10181752	RESISTOR	1						
11	10181752-306	10181752	RESISTOR	1						
12	10181752-297	10181752	RESISTOR	1						
13	10181752-289	10181752	RESISTOR	1						
14	10181752-271	10181752	RESISTOR	1						
15	10181752-310	10181752	RESISTOR	1						
16	10181751-55	10181751	RESISTOR	1						1
	10181751-1	10181751	RESISTOR							
	10181751-2	10181751	RESISTOR							
	10181751-3	10181751	RESISTOR							
	10181751-4	10181751	RESISTOR							
	10181751-5	10181751	RESISTOR							
	10181751-6	10181751	RESISTOR							

12.1.2 Output IGESView



U.S. ARMY MATERIEL COMMAND
U.S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA

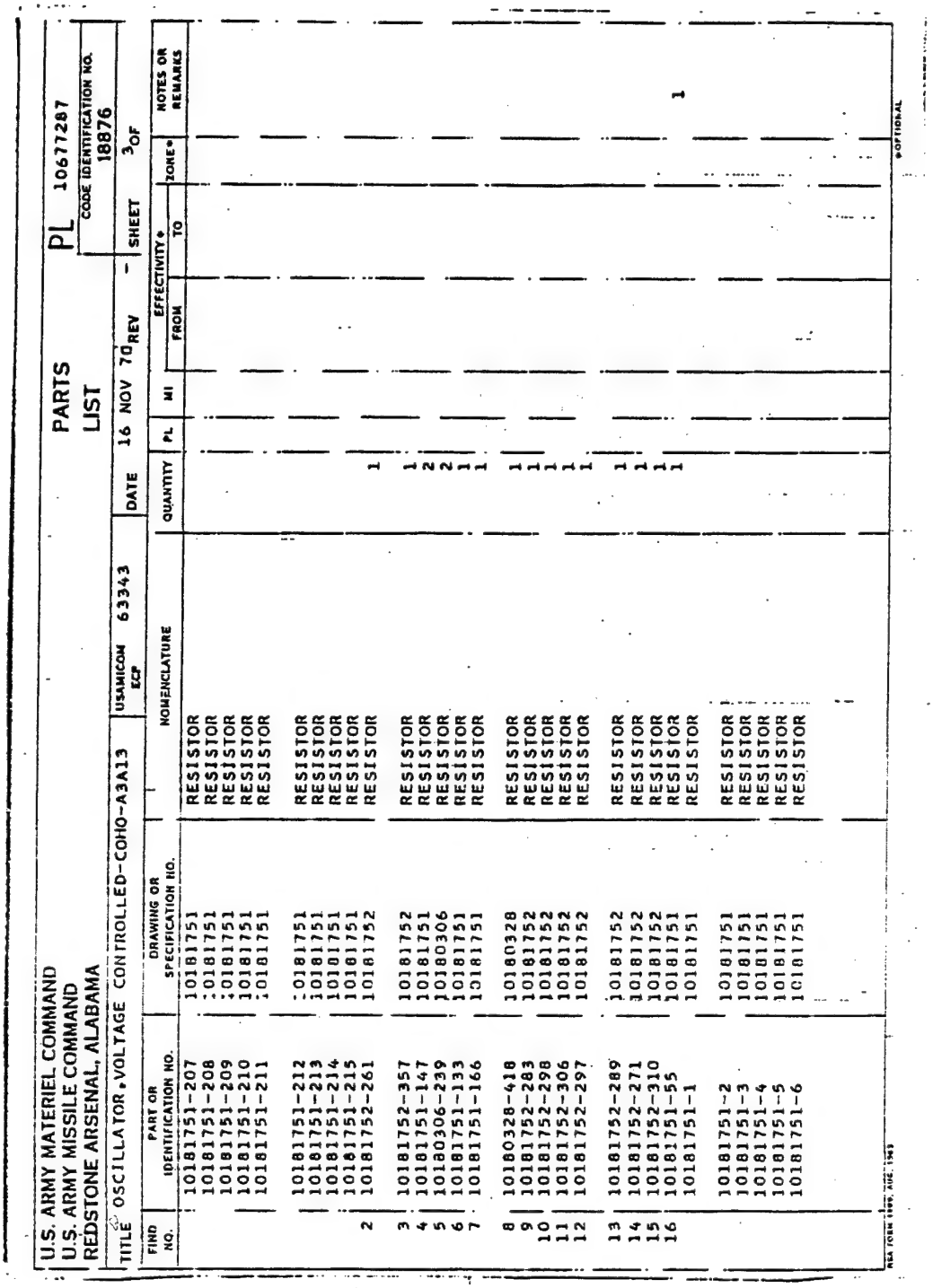
PARTS LIST

PL 10677287
CODE IDENTIFICATION NO. 18876

TITLE OSCILLATOR,VOLTAGE CONTROLLED-COMO-A3A13 | USAMICOM RCP 63343 | DATE 16 NOV 70 REV - | SHEET 3 OF

FIND NO.	PART OR IDENTIFICATION NO.	DRAWING OR SPECIFICATION NO.	NOMENCLATURE	QUANTITY	PL	MI	EFFECTIVITY - FROM	TO	ZONE	NOTES OR REMARKS
	10181751-207	10181751	RESISTOR							
	10181751-208	10181751	RESISTOR							
	10181751-209	10181751	RESISTOR							
	10181751-210	10181751	RESISTOR							
	10181751-211	10181751	RESISTOR							
	10181751-212	10181751	RESISTOR							
	10181751-213	10181751	RESISTOR							
	10181751-214	10181751	RESISTOR							
	10181751-215	10181751	RESISTOR							
2	10181752-261	10181752	RESISTOR	1						
3	10181752-357	10181752	RESISTOR	1						
4	10181751-147	10181751	RESISTOR	2						
5	10180306-239	10180306	RESISTOR	2						
6	10181751-133	10181751	RESISTOR	1						
7	10181751-166	10181751	RESISTOR	1						
8	10180328-418	10180328	RESISTOR	1						
9	10181752-283	10181752	RESISTOR	1						
10	10181752-298	10181752	RESISTOR	1						
11	10181752-306	10181752	RESISTOR	1						
12	10181752-297	10181752	RESISTOR	1						
13	10181752-289	10181752	RESISTOR	1						
14	10181752-271	10181752	RESISTOR	1						
15	10181752-310	10181752	RESISTOR	1						
16	10181751-55	10181751	RESISTOR	1						1
	10181751-1	10181751	RESISTOR							
	10181751-2	10181751	RESISTOR							
	10181751-3	10181751	RESISTOR							
	10181751-4	10181751	RESISTOR							
	10181751-5	10181751	RESISTOR							
	10181751-6	10181751	RESISTOR							

12.1.3 Output g42tiff/IslandPaint



U.S. ARMY MATERIEL COMMAND
U.S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA

PARTS LIST

PL 10677287

CODE IDENTIFICATION NO. 18876

TITLE OSCILLATOR, VOLTAGE CONTROLLED-COHO-A3A13 | USAMICOM ECP 63343 | DATE 16 NOV 70 | REV - | SHEET 3 OF

FIND NO.	PART OR IDENTIFICATION NO.	DRAWING OR SPECIFICATION NO.	NOMENCLATURE	QUANTITY	PL	MI	EFFECTIVITY* FROM	EFFECTIVITY* TO	ZONE*	NOTES OR REMARKS
	10181751-207	10181751	RESISTOR							
	10181751-208	10181751	RESISTOR							
	10181751-209	10181751	RESISTOR							
	10181751-210	10181751	RESISTOR							
	10181751-211	10181751	RESISTOR							
	10181751-212	10181751	RESISTOR							
	10181751-213	10181751	RESISTOR							
	10181751-214	10181751	RESISTOR							
	10181751-215	10181751	RESISTOR							
2	10181752-261	10181752	RESISTOR	1						
3	10181752-357	10181752	RESISTOR	1						
4	10181751-147	10181751	RESISTOR	2						
5	10180306-239	10180306	RESISTOR	2						
6	10181751-133	10181751	RESISTOR	1						
7	10181751-166	10181751	RESISTOR	1						
8	10180328-418	10180328	RESISTOR	1						
9	10181752-283	10181752	RESISTOR	1						
10	10181752-298	10181752	RESISTOR	1						
11	10181752-306	10181752	RESISTOR	1						
12	10181752-297	10181752	RESISTOR	1						
13	10181752-289	10181752	RESISTOR	1						
14	10181752-271	10181752	RESISTOR	1						
15	10181752-310	10181752	RESISTOR	1						
16	10181751-55	10181751	RESISTOR	1						
	10181751-1	10181751	RESISTOR						1	
	10181751-2	10181751	RESISTOR							
	10181751-3	10181751	RESISTOR							
	10181751-4	10181751	RESISTOR							
	10181751-5	10181751	RESISTOR							
	10181751-6	10181751	RESISTOR							

*OPTIONAL

12.1.4 Output Preview

U.S. ARMY MATERIEL COMMAND
U.S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA

PARTS LIST

PL 10677287

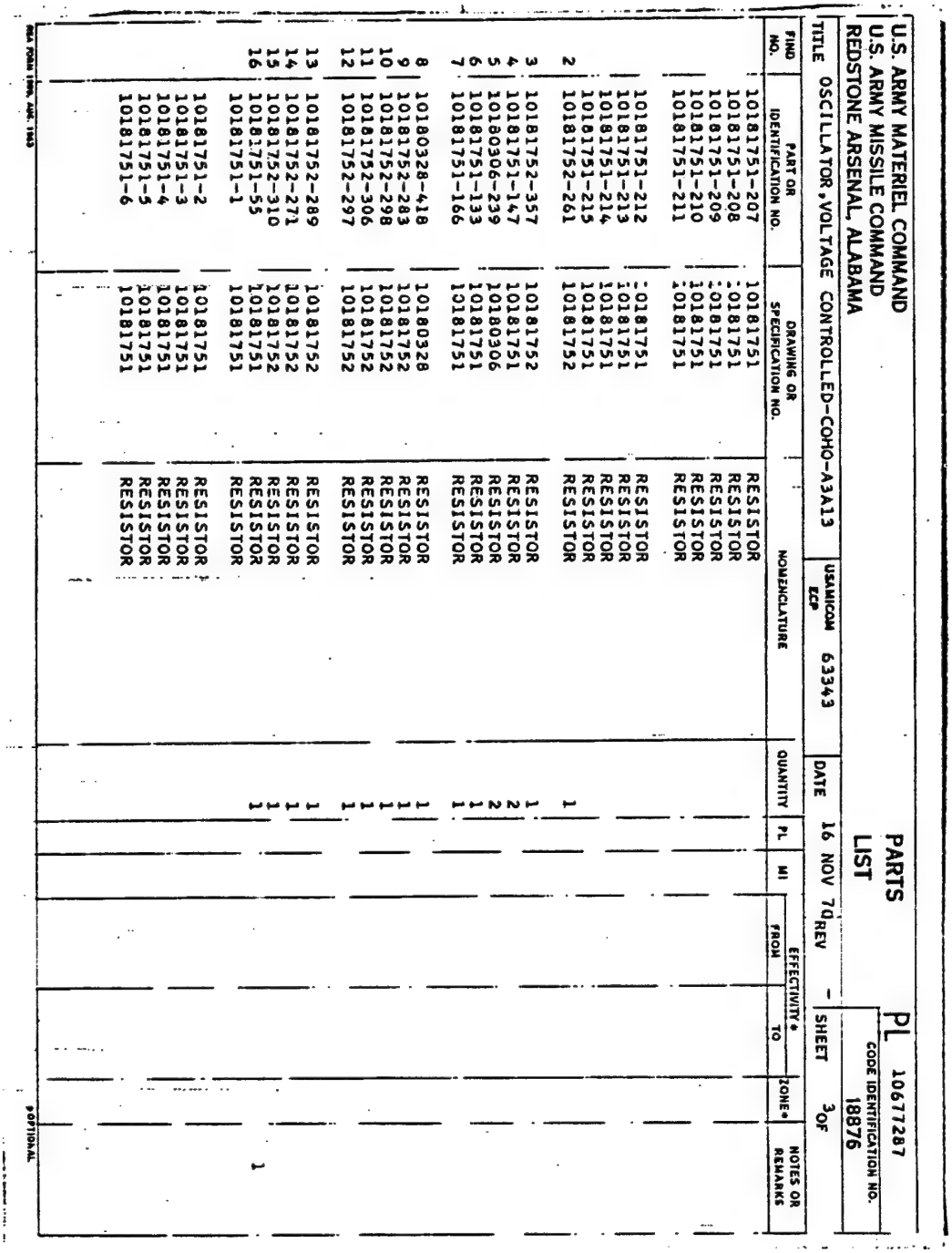
CODE IDENTIFICATION NO. 18876

TITLE OSCILLATOR,VOLTAGE CONTROLLED-COHO-A3A13 | USAMICOM ECP 63343 | DATE 16 NOV 70 | REV - | SHEET 3 OF

FIND NO.	PART OR IDENTIFICATION NO.	DRAWING OR SPECIFICATION NO.	NOMENCLATURE	QUANTITY	PL	MI	EFFECTIVITY * FROM	EFFECTIVITY * TO	ZONE *	NOTES OR REMARKS
	10181751-207	10181751	RESISTOR							
	10181751-208	10181751	RESISTOR							
	10181751-209	10181751	RESISTOR							
	10181751-210	10181751	RESISTOR							
	10181751-211	10181751	RESISTOR							
	10181751-212	10181751	RESISTOR							
	10181751-213	10181751	RESISTOR							
	10181751-214	10181751	RESISTOR							
	10181751-215	10181751	RESISTOR							
2	10181752-261	10181752	RESISTOR	1						
3	10181752-357	10181752	RESISTOR	1						
4	10181751-147	10181751	RESISTOR	2						
5	10180306-239	10180306	RESISTOR	2						
6	10181751-133	10181751	RESISTOR	1						
7	10181751-166	10181751	RESISTOR	1						
8	10180328-418	10180328	RESISTOR	1						
9	10181752-283	10181752	RESISTOR	1						
10	10181752-298	10181752	RESISTOR	1						
11	10181752-306	10181752	RESISTOR	1						
12	10181752-297	10181752	RESISTOR	1						
13	10181752-289	10181752	RESISTOR	1						
14	10181752-271	10181752	RESISTOR	1						
15	10181752-310	10181752	RESISTOR	1						
16	10181751-55	10181751	RESISTOR	1						1
	10181751-1	10181751	RESISTOR							
	10181751-2	10181751	RESISTOR							
	10181751-3	10181751	RESISTOR							
	10181751-4	10181751	RESISTOR							
	10181751-5	10181751	RESISTOR							
	10181751-6	10181751	RESISTOR							

NSA FORM 1000, AUG. 1965 — * OPTIONAL

12.1.5 Output HiJaak/Ventura Publisher



U.S. ARMY MATERIEL COMMAND
U.S. ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA

PARTS LIST

PL 10677287
CODE IDENTIFICATION NO. 18876

TITLE OSCILLATOR,VOLTAGE CONTROLLED-COHO-A3A13 | USAMICOM ECP 63343 | DATE 16 NOV 70 | REV - | SHEET 3 OF

FIND NO.	PART OR IDENTIFICATION NO.	DRAWING OR SPECIFICATION NO.	NOMENCLATURE	QUANTITY	PL	MI	EFFECTIVITY * FROM	EFFECTIVITY * TO	ZONE*	NOTES OR REMARKS
	10181751-207	10181751	RESISTOR							
	10181751-208	10181751	RESISTOR							
	10181751-209	10181751	RESISTOR							
	10181751-210	10181751	RESISTOR							
	10181751-211	10181751	RESISTOR							
	10181751-212	10181751	RESISTOR							
	10181751-213	10181751	RESISTOR							
	10181751-214	10181751	RESISTOR							
	10181751-215	10181751	RESISTOR							
2	10181752-261	10181752	RESISTOR	1						
3	10181752-357	10181752	RESISTOR	1						
4	10181751-147	10181751	RESISTOR	2						
5	10180306-239	10180306	RESISTOR	2						
6	10181751-133	10181751	RESISTOR	1						
7	10181751-166	10181751	RESISTOR	1						
8	10180328-418	10180328	RESISTOR	1						
9	10181752-283	10181752	RESISTOR	1						
10	10181752-298	10181752	RESISTOR	1						
11	10181752-306	10181752	RESISTOR	1						
12	10181752-297	10181752	RESISTOR	1						
13	10181752-289	10181752	RESISTOR	1						
14	10181752-271	10181752	RESISTOR	1						
15	10181752-310	10181752	RESISTOR	1						
16	10181751-55	10181751	RESISTOR	1						
	10181751-1	10181751	RESISTOR	1						
	10181751-2	10181751	RESISTOR							
	10181751-3	10181751	RESISTOR							
	10181751-4	10181751	RESISTOR							
	10181751-5	10181751	RESISTOR							
	10181751-6	10181751	RESISTOR							1

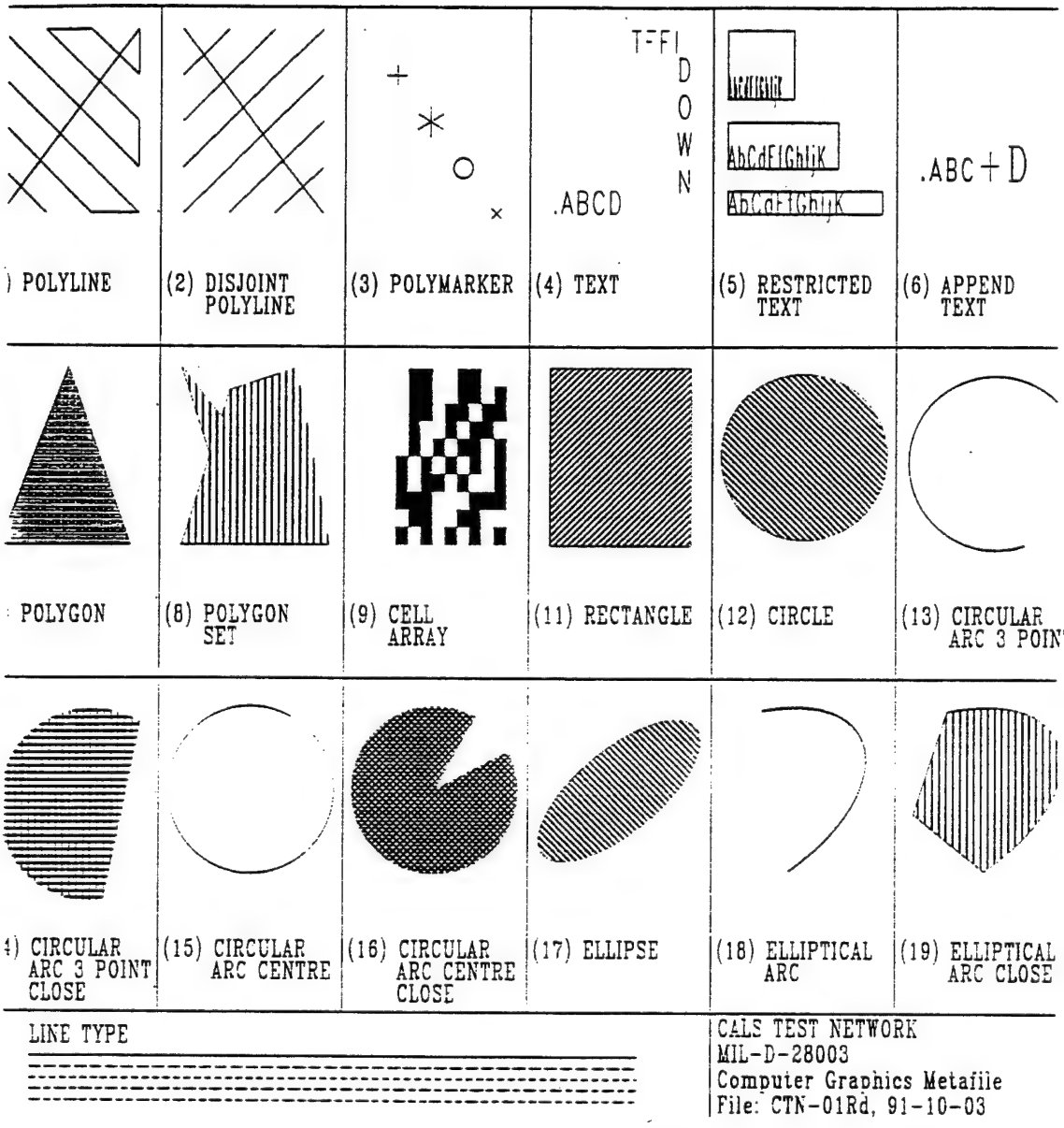
DA FORM 1999, MAR. 1963

*OPTIONAL

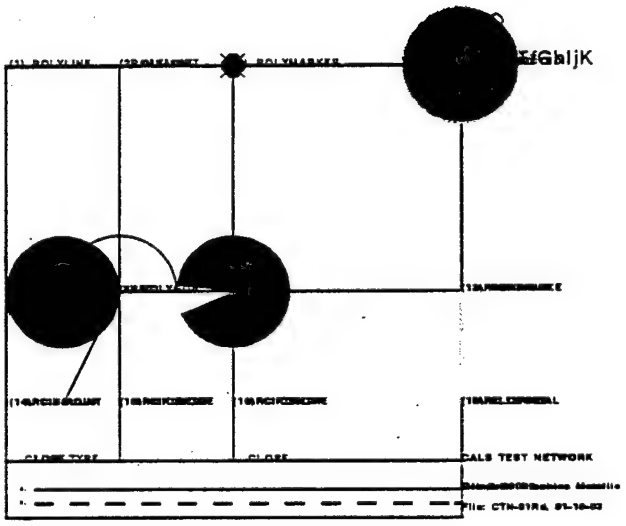
13. Appendix E - Detailed CGM Analysis

13.1 File C104

13.1.1 Output cgm2draw/IslandDraw

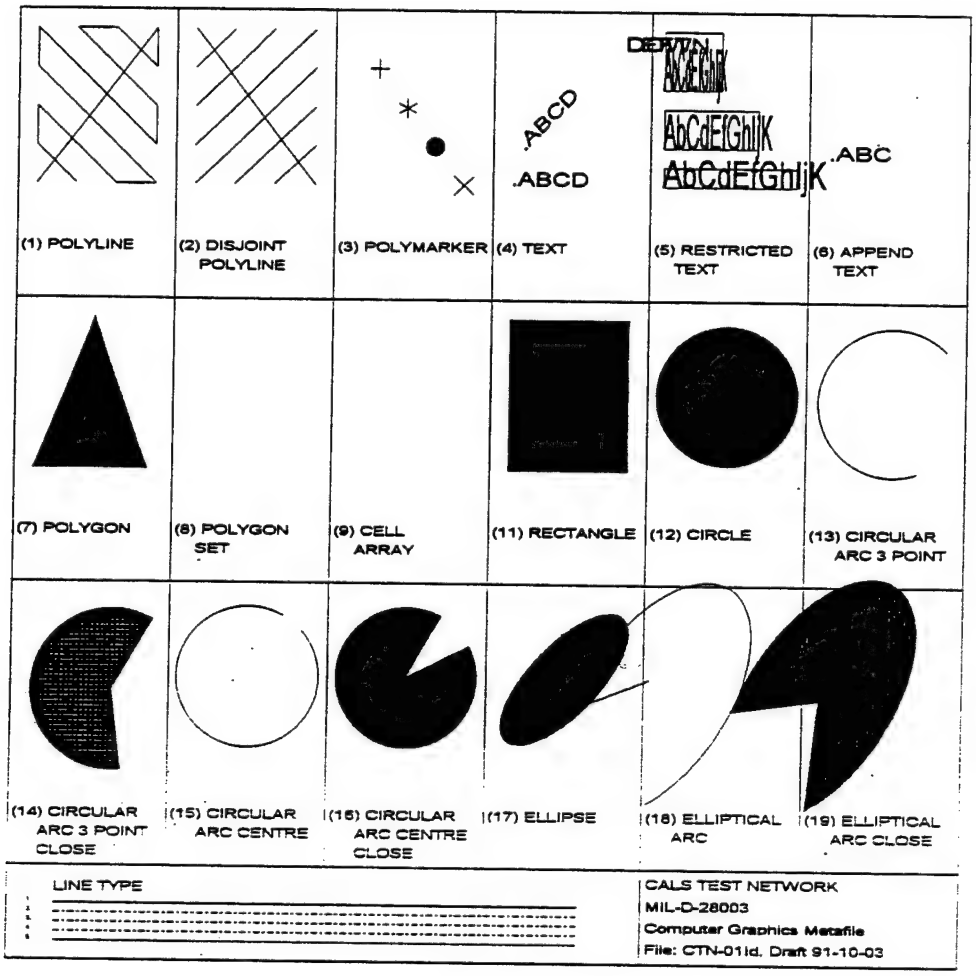


13.1.2 Output Harvard Graphics

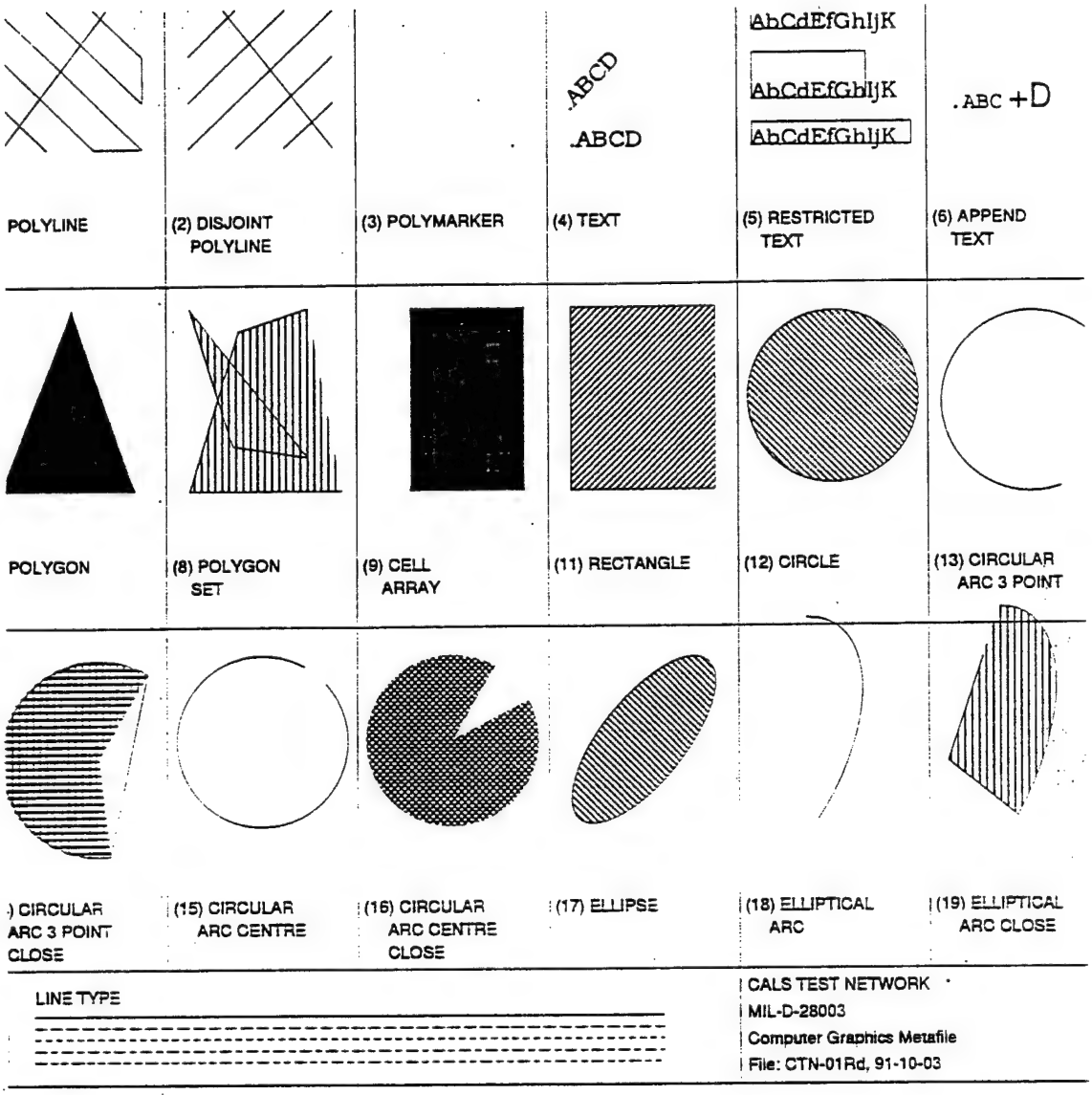


D002C004
T1

13.1.3 Output HiJaak Windows

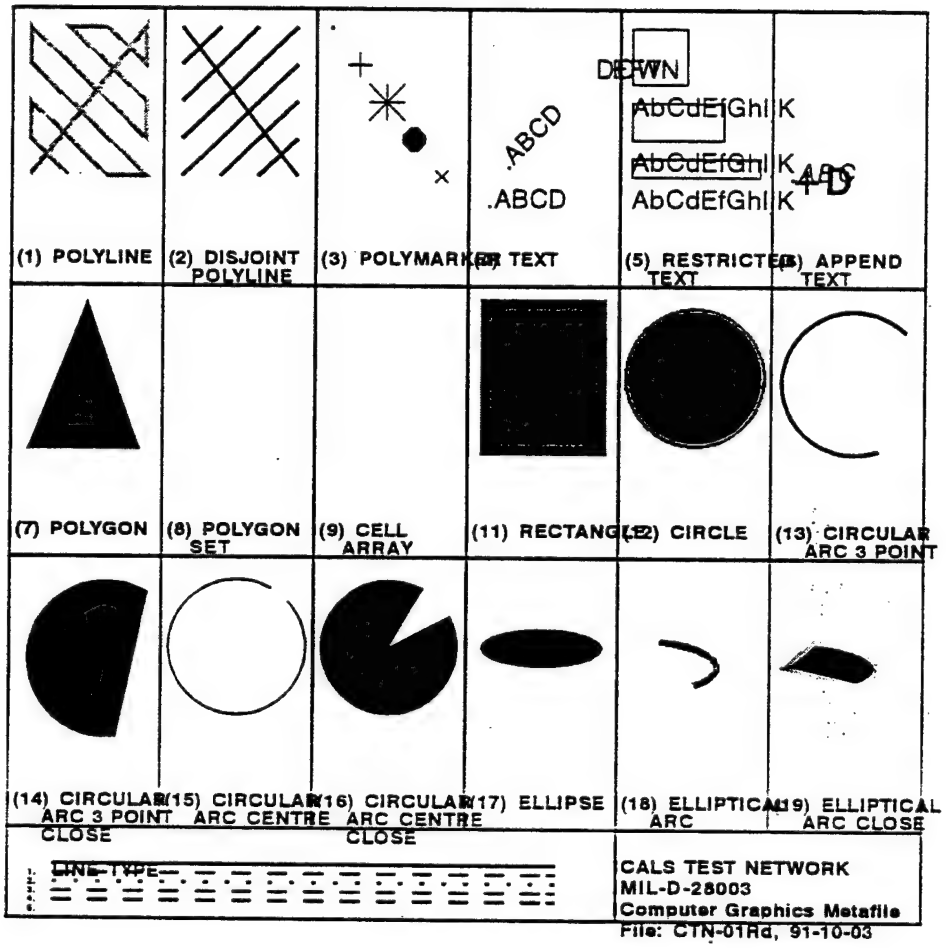


13.1.4 Output IslandDraw



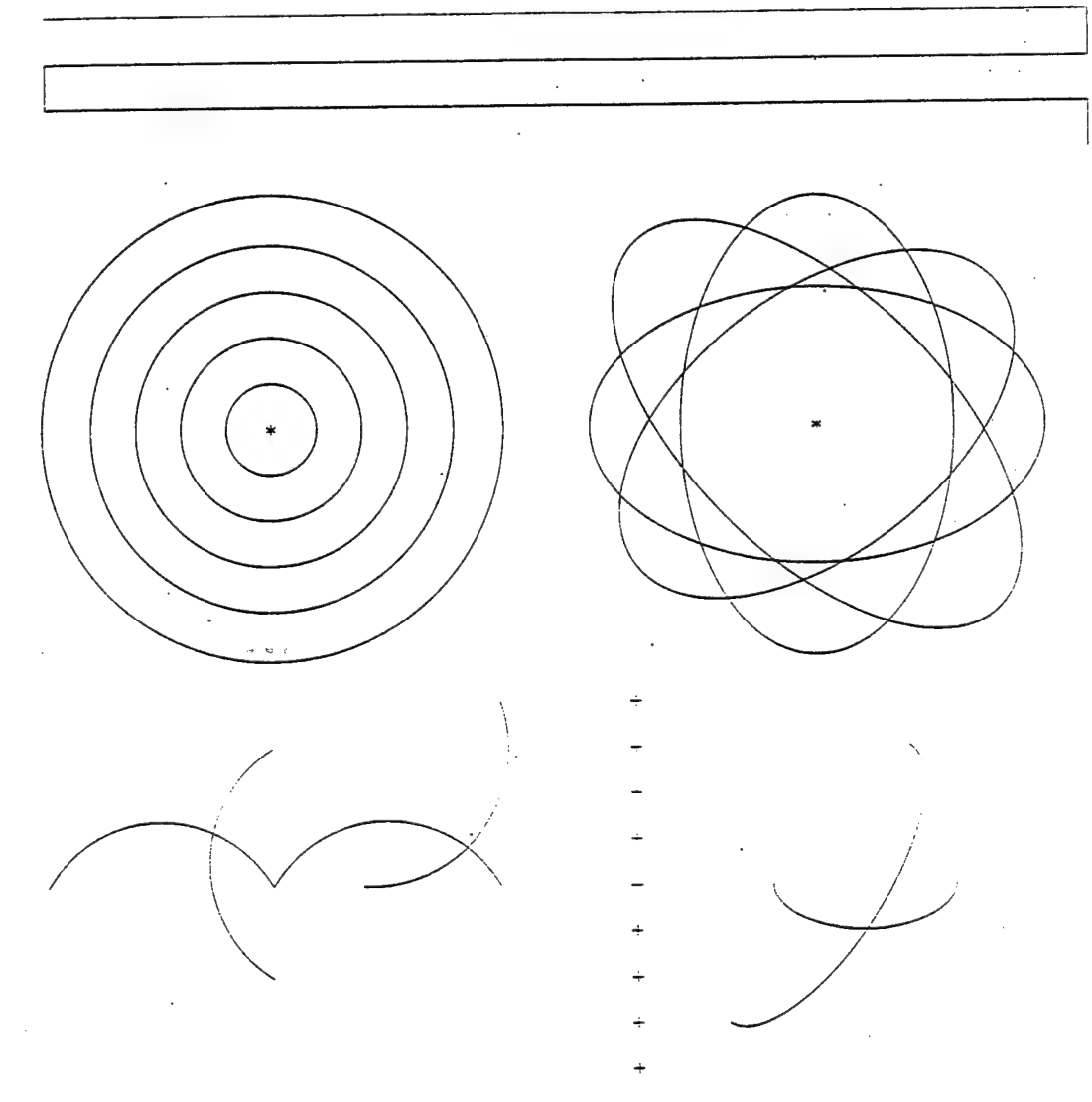
13.2 File C204

13.2.1 Output Harvard Graphics

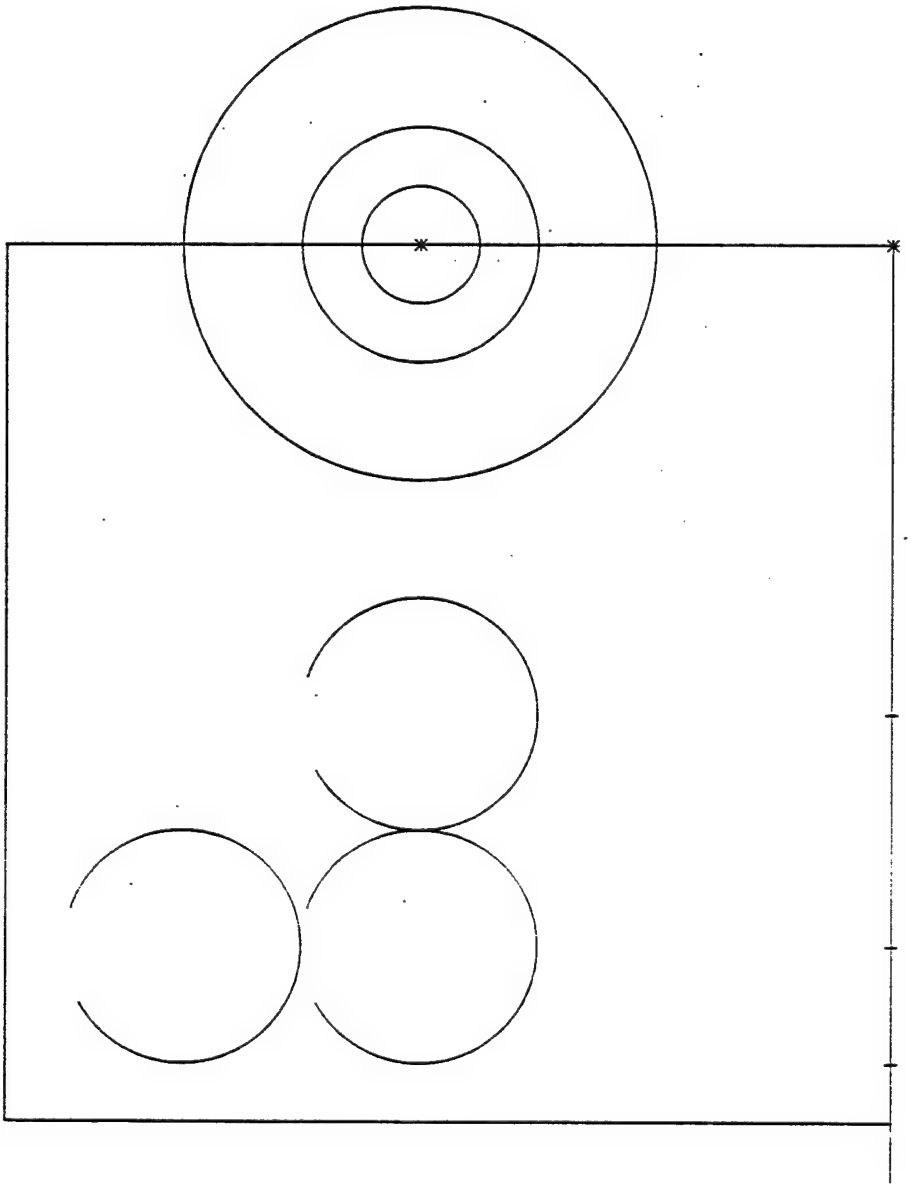


13.3 File C105

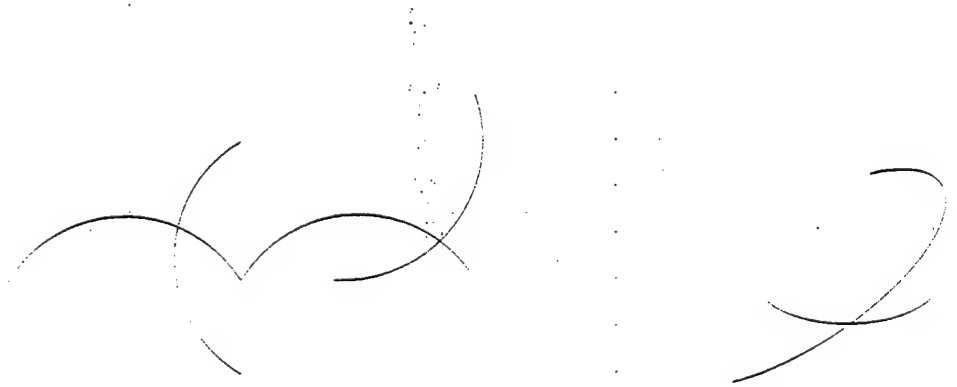
13.3.1 Output cgm2draw/IslandDraw



13.3.2 Output Harvard Graphics

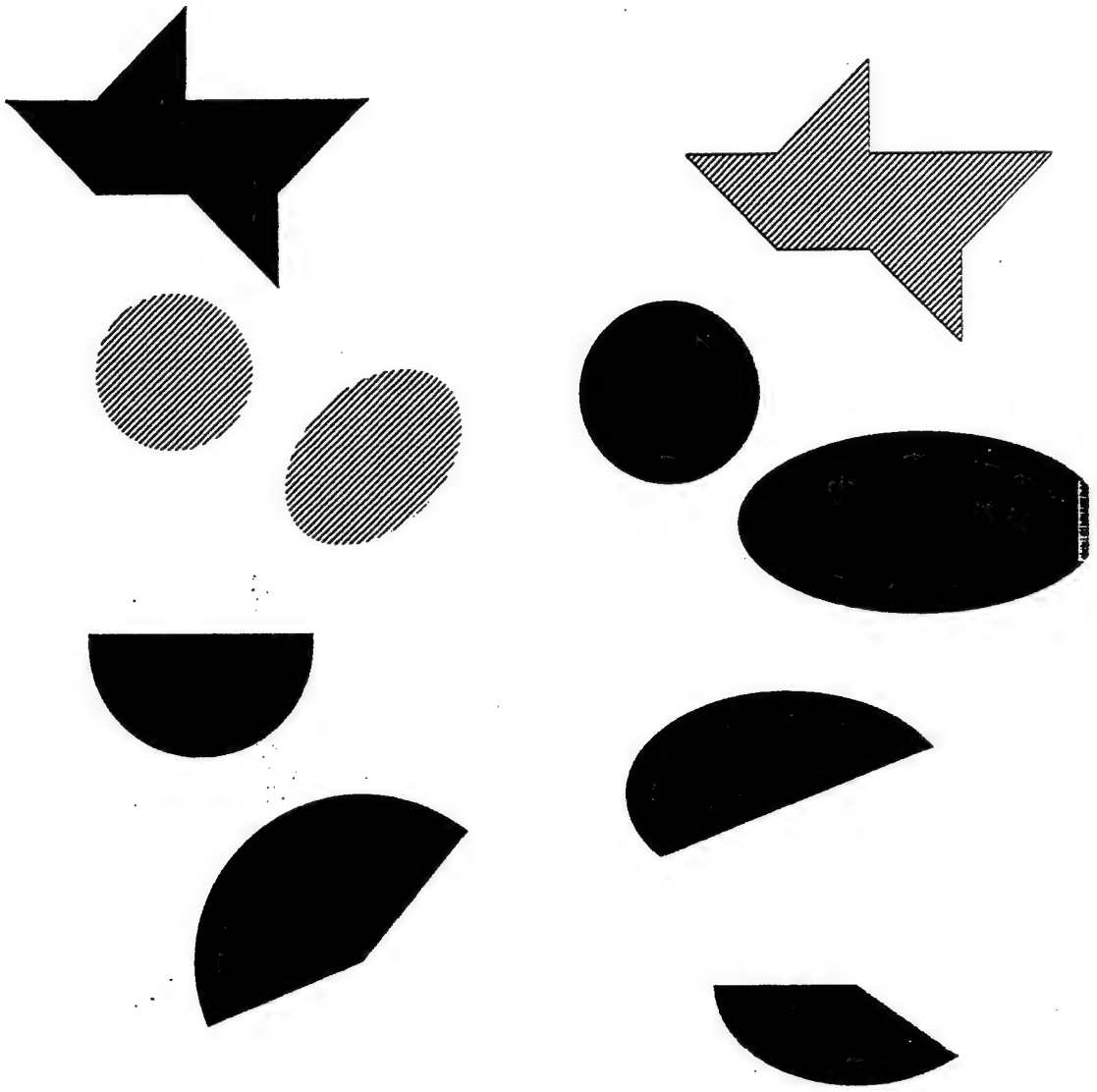


13.3.3 Output IslandDraw

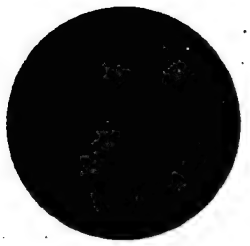


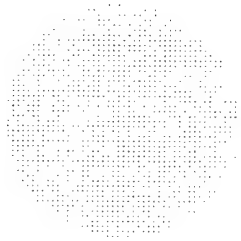
13.4 File C106

13.4.1 Output cgm2draw/IslandDraw

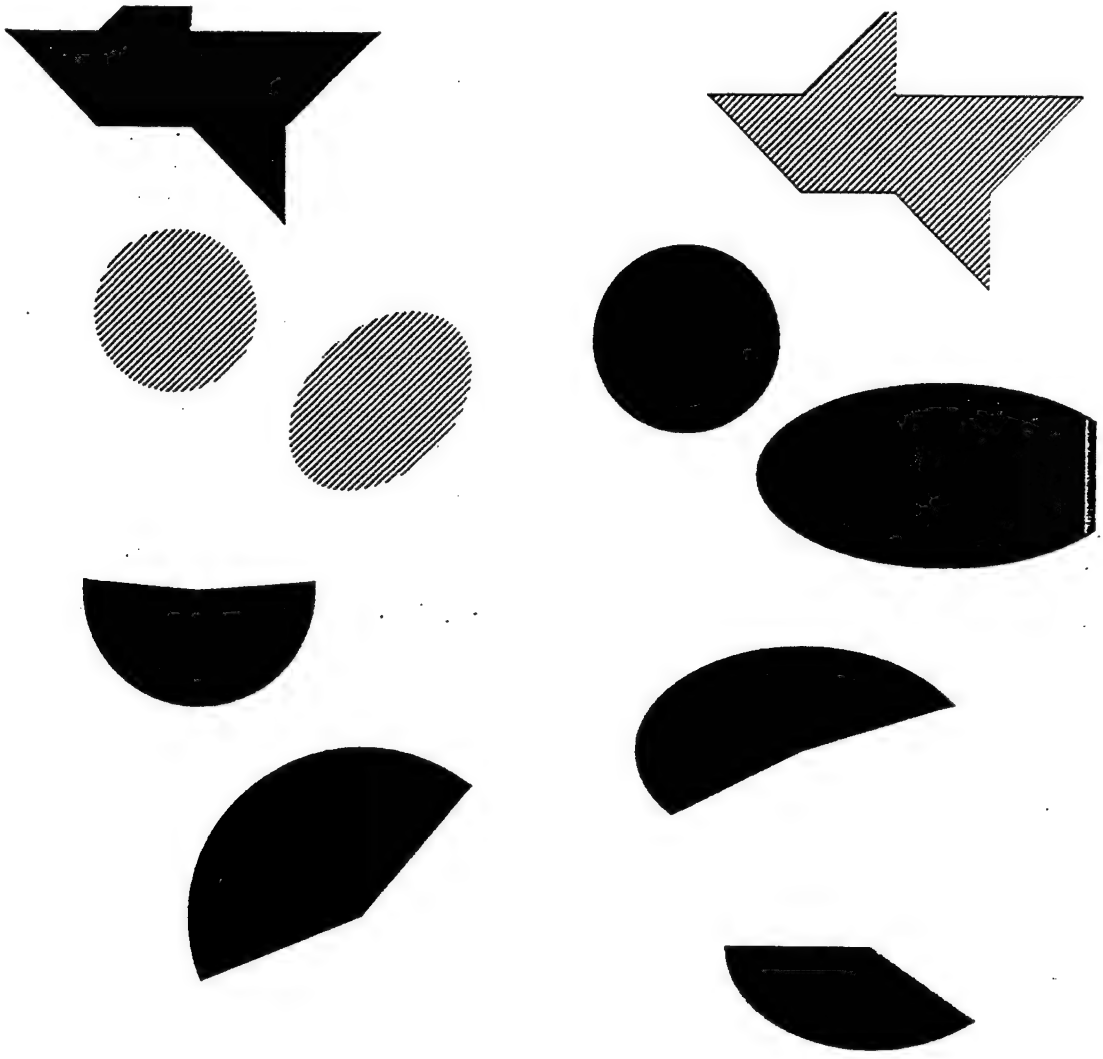


13.4.2 Output Harvard Graphics





13.4.3 Output IslandDraw



13.5 File C107

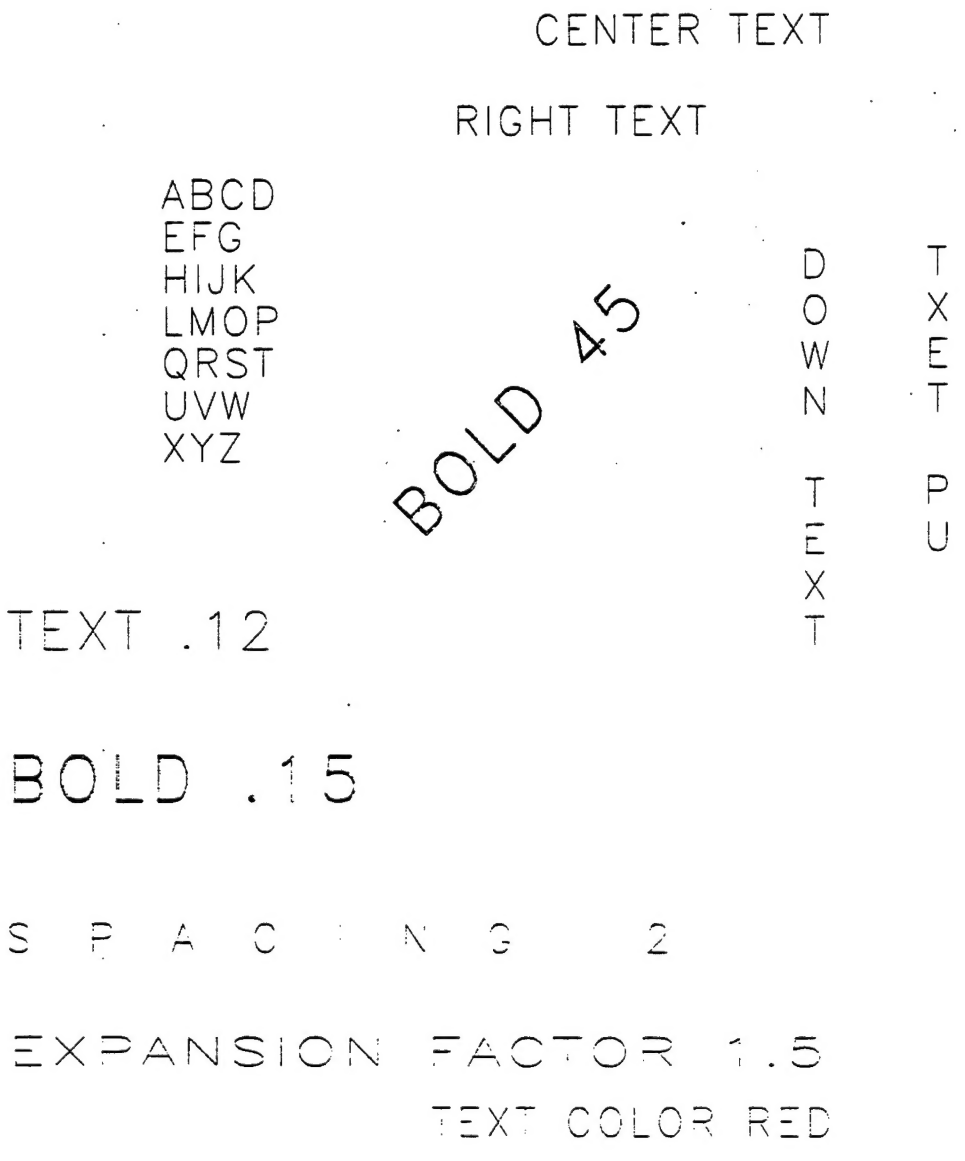
13.5.1 Output cgm2draw/IslandDraw

13.5.2 Output Harvard Graphics

13.5.3 Output IslandDraw

13.6 File C108

13.6.1 Output cgm2draw/IslandDraw



13.6.2 Output Harvard Graphics

TEXT 12

BOLD .15

SPACING 2

EXPANSION FACTOR 1.5

TEXT COLOR RED

13.6.3 Output IslandDraw

RIGHT TEXT

ABCD
EFG
HIJK
LMOP
QRST
UVW
XYZ

DOWN TEXT

BOLD 45

TEXT .12

BOLD .15

SPACING 2

EXPANSION FACTOR 1.5

TEXT COLOR RED